American Aviation

APRIL 11, 1955

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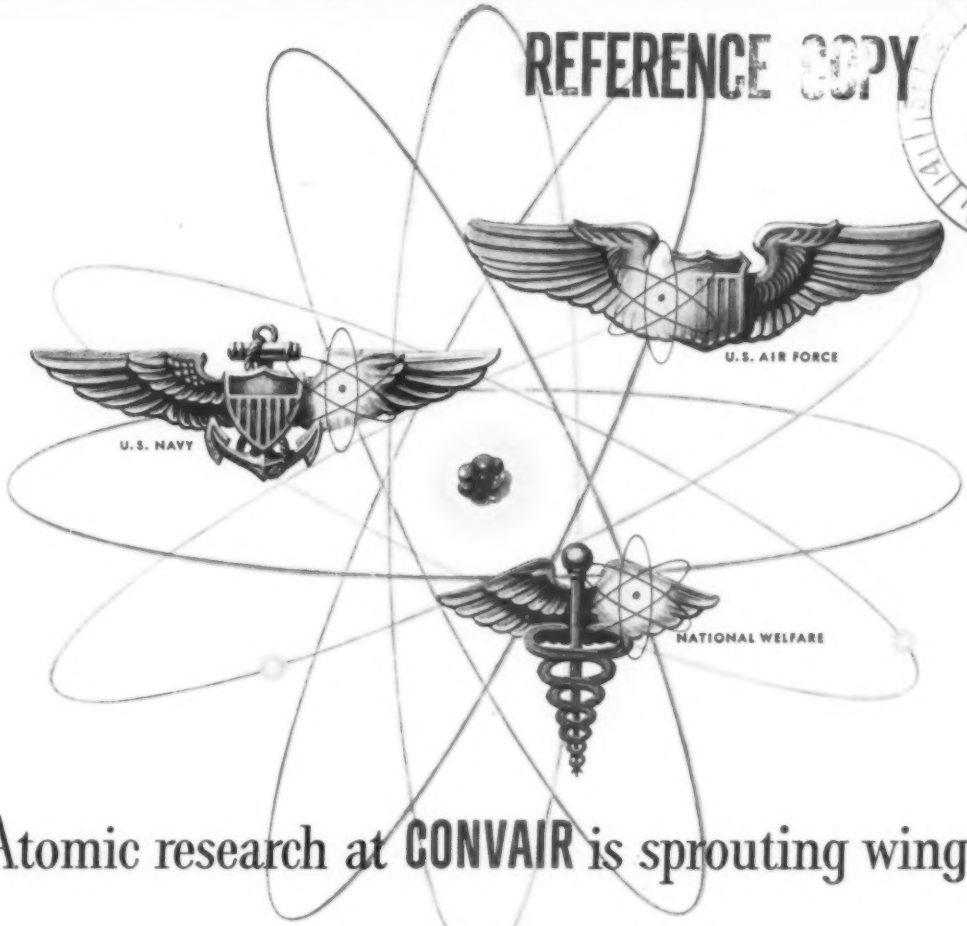

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Convair's engineers and nuclear physicists are making bold strides toward the flight of atomic-powered aircraft.

At Fort Worth, with the largest staff of its kind in the industry, Convair is operating the first U.S. Air Force atomic reactor and laboratory. And at San Diego, Convair engineers are working toward the adaptation of nuclear energy for the development of other weapons systems.

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Atomic research at Convair is sprouting wings . . . wings for the nation's defense and welfare.

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A DIVISION OF GENERAL DYNAMICS CORPORATION

The unmatched versatility of the Wilcox Type 99 Transmitter makes it preferred on any type of airport, here or abroad.

No other transmitter has such a wide range of flexibility. It accommodates up to four RF channels. Any combination of LF, HF or VHF can be inserted. Dual modulators permit completely independent and simultaneous transmission on any two RF channels with A2 or A3 emission. Three channels may be operated with A1 or F1 emission.

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Final proof of Type 99 performance—the many hundreds of units ordered on a repeat basis by the U. S. Government, commercial airlines, and other governments throughout the world.

Frequency ranges:
125-525 kc.
2-20 mc.
118-132 mc. (Frequencies to 152 mc. available on special order.)

Power output:
400 watts LF and HF.
250 watts VHF.

Antenna requirements:
125-525 kc. 20-600 ohms, balanced or unbalanced.
2-20 mc. 70-600 ohms, balanced or unbalanced.
118-152 mc. 52 or 70 ohm coaxial line.

Type of modulation:
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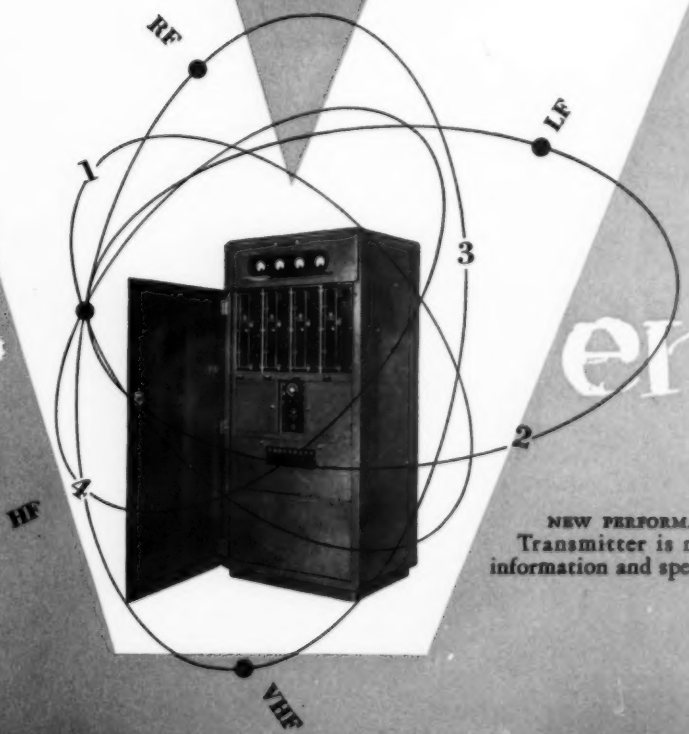
Power requirements:
5 KVA maximum.
208-250 V.A.C. single phase.

no other transmitter can match it!

So versatile



NEW PERFORMANCE DATA on the Wilcox Type 99 Transmitter is now available. For this and other information and specifications, write . . .

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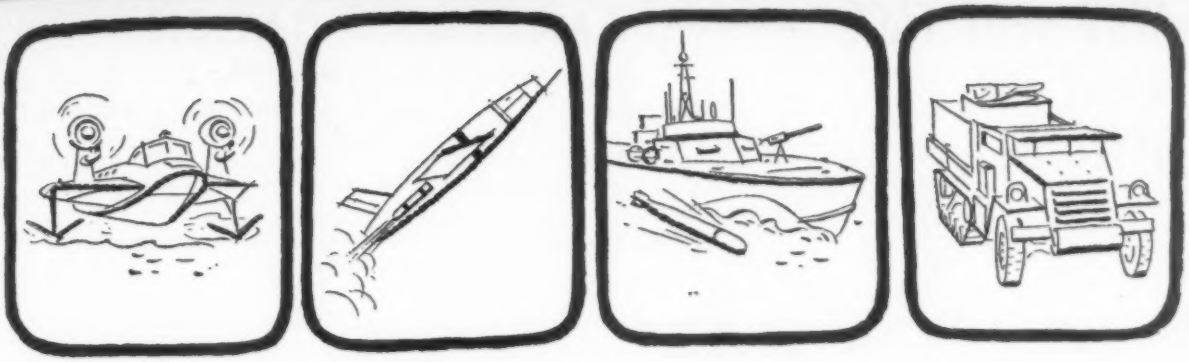

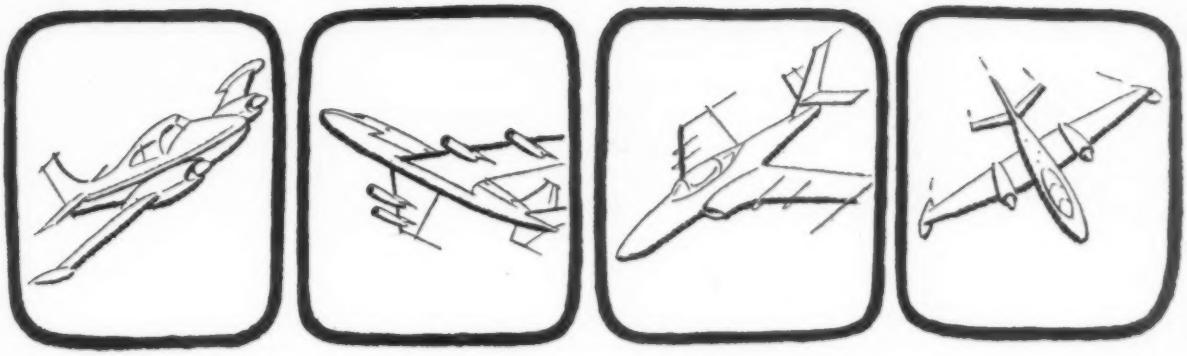

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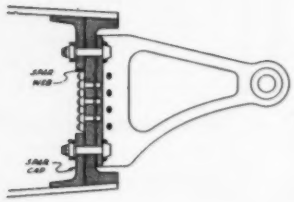
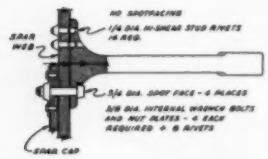
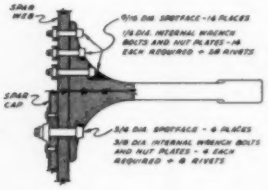




Excessive spot facing, weight, and bulk are eliminated from removable fittings such as aileron hinge brackets, when HI-SHEAR stud rivets are used to carry the shear loads. On the above example four bolts speed up removal or installation of the fitting in the shop or on the flight ramp.



Fittings using bolts to carry the shear loads, require spot facing in fillet areas. These fittings must be heavier in weight to retain strength to avoid stress concentration and are larger in size to obtain bolt clearances. In example, the fitting with bolts suffers a weight increase of about 30% and requires removal or installation of an additional fourteen bolts.

WRITE
for the HI-SHEAR Standards Manual for specific data on the HI-SHEAR stud rivet.

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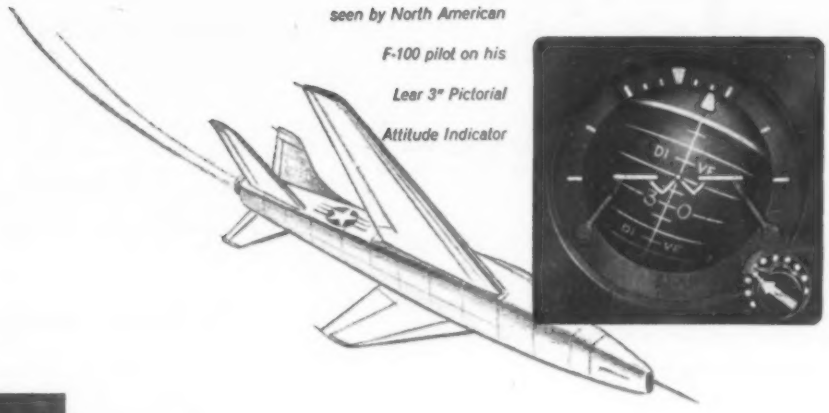

Diving turn as seen by North American F-100 pilot on his Lear 3" Pictorial Attitude Indicator

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Climbing turn as seen by McDonnell F3H pilot on his Lear 5" Pictorial Attitude Indicator

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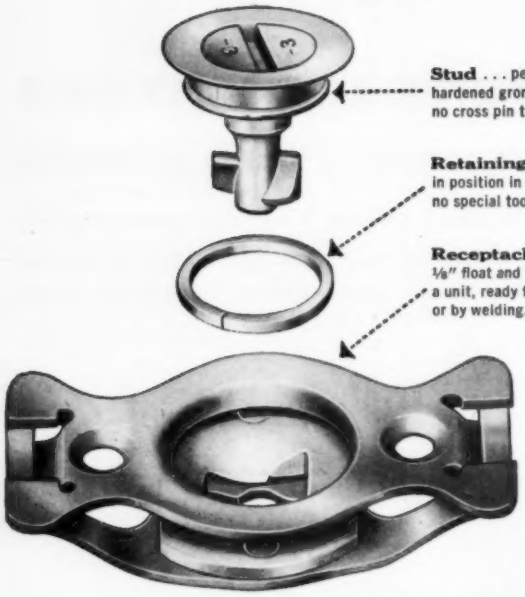

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Doctors in the Sky. *By Col. Robert J. Benford, M.D. (USAF). 326 pages. Published by Chas. C. Thomas, Springfield, Ill. $8.75.*

The history of the Aero Medical Assn. since its founding in 1929 is traced by the author. All of the 25 annual meetings are described, as are the developments in civil and military aero medicine which paralleled the growth of the society.

. . . WK

The World's Fighting Planes. *By Wm. Green and Gerald Pollinger. Published by Hanover House, 575 Madison Ave., New York 22, N. Y. $3.50 240 pages.*

Photos, three-view drawings, and data on over 240 fighting aircraft. Combat aircraft still in use somewhere in the world are included, even if they have become obsolete in the country in which they were originally produced.

. . . WK

Development of the Guided Missile. *By Kenneth W. Gatland. Published by Philosophical Library, 15 East 40 St., New York 16, N. Y. 100 illustrations $4.75. 292 pages.*

Second edition of this collection of theory and detail on missiles, first published in 1952, considerably expanded. Table of missile data.

. . . WK

Comet Report. *(Civil Aircraft Accident. Report of the Court of Inquiry into the Accidents to Comet G-ALYP on 10 January 1954 and Comet G-ALYY on 8 April 1954). Published by the British government and obtainable from British Information Services, 30 Rockefeller Plaza, New York 20, N. Y. $1.80. 48 pp.*

This booklet is the report of the public inquiry into the causes and cir-

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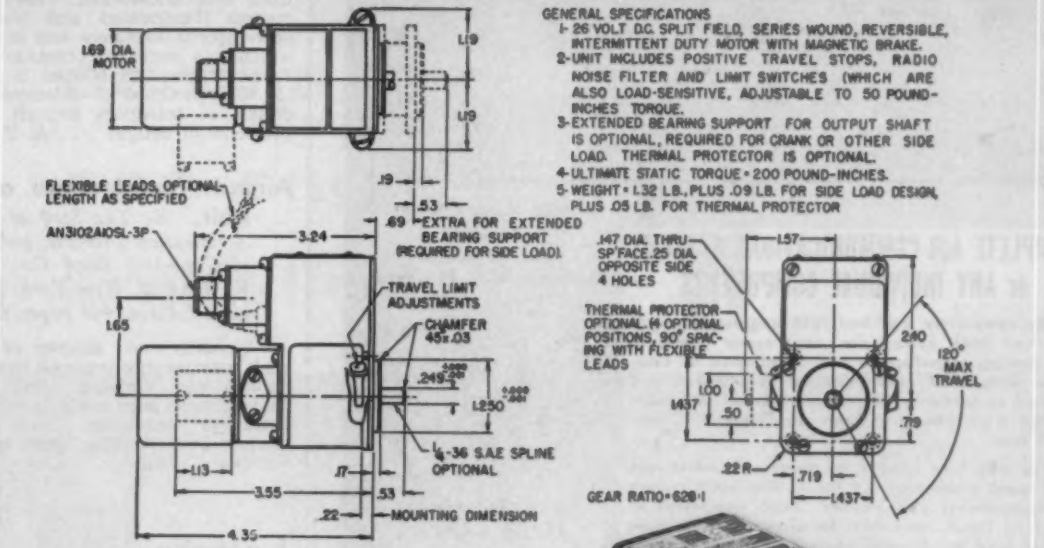
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Once the original limits are set, this compact rotary actuator actually "senses" the additional load imposed by running against the adjustable stops, and halts automatically. This load-sensing feature, plus the positive stops, eliminates over-travel completely. These features have attracted the attention of such leaders as Grumman, McDonnell, Lockheed, North American, Republic, Fairchild, A. V. Roe, and Piasecki—all of them now large-scale ROTORette users.

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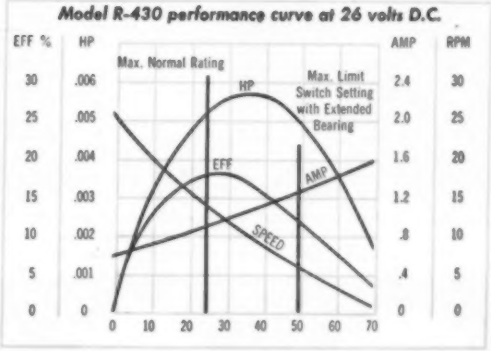

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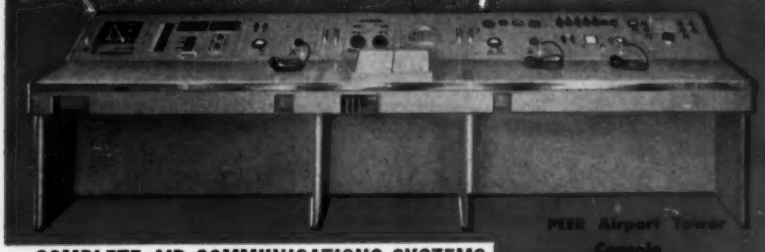

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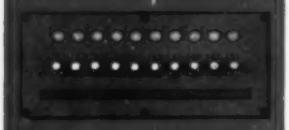
PEER Regulated Output Amplifier



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cumstances of the two Comet accidents last year. It includes a history of the Comet project and a condensed account of what seems to have been the most intricate piece of aviation detection work ever undertaken. There are numerous illustrations and photographs of recovered wreckage and of a Comet which was tested to breakage point at Farnborough. The booklet is a "must" for all concerned or interested in the design of transport aircraft and the problems of fatigue . . . A. V.

Aircraft Maintenance and Repair.

By The Staff of Northrop Aeronautical Institute, published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. Revised Edition, 444 pages, illustrated.

Virtually every chapter of this aircraft maintenance textbook has been expanded and updated. Most extensive changes have been made in sections devoted to hydraulics, brake systems, landing gear, riveting, sheet metal and woodwork. JSM

Letters

Goodwill from Overseas

To the Editor:

We read the article on KLM West Indies Division (AMERICAN AVIATION, Feb. 28) with interest and compliment you with the way your reporter combined all the facts that were poured into him during his short visit.

We think it a very nice idea to gain some goodwill for you, for aviation and for KLM, from the Government of the Netherlands Antilles, by giving reprints to the local officials of the N. W. I. We would therefore request you kindly to let us have some reprints of the article.

Very truly yours,

C. A. A. BOS
KLM—Royal Dutch Airlines
West Indies Division
Curacao

High Take Home Pay

To the Editor:

Several issues ago in AMERICAN AVIATION you mentioned the high pay scales of LAV pilots.

I believe our pilots flying our equipment on wet-lease contracts exceeded LAV's scale.

During the conflict in Indo-China our DC-4 pilots averaged US $2650.65 per month and the C-46 pilots averaged US $2495.65 per month plus a hazard bonus for certain flights. These are all "take home" wages.

Needless to say a good many hours were spent in the cockpit and the men did not complain one bit when they returned to the regular schedule of 80 hours per month. One pilot hit an all time high of 211 hours in 30 days. He has since purchased, and retired to, a "stump-ranch" in the State of Washington.

DONALD F. HOIRUP
U. S. Airlines Executive Vice President

cargo:
one engineer
and slide rule

AERO COMMANDER

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2) Potentiometer
3) Ruggedized Galvos
4) Test Circuits

● Of the many factors affecting jet engine life, efficiency, and safe operation, two of the most important are *Exhaust Gas Temperature* (EGT) and *Engine Speed* (RPM). Excess heat will reduce "bucket" life as much as 50% and low EGT materially reduces efficiency and thrust. Any of such conditions will make operation of the aircraft both costly and dangerous. The JETCAL Analyzer predetermines accuracy of the EGT and Tachometer systems and isolates errors if they exist.

JETCAL

ANALYZES JET ENGINES 10 WAYS!

1) The JETCAL ANALYZER *functionally* tests the EGT thermocouple circuit of a jet aircraft or pilotless aircraft missile for error *without running the engine or disconnecting any wiring.* GUARANTEED ACCURACY IS ±4°C. at engine test temperature.

2) Checks individual thermocouples "on the bench" before placement in parallel harness.

3) Checks thermocouples within the harness for continuity.

4) Checks thermocouples *and* paralleling harness for accuracy.

5) Checks resistance of the EGT circuit *without the EGT Indicator.*

6) Checks insulation of the EGT circuit for shorts to ground and for shorts between leads.

7) Checks EGT Indicators (in or out of aircraft).

8) Checks EGT system with engine removed from aircraft (in production line or overhaul shop).

9) Checks aircraft TACHOMETER system accuracy to within ±0.2% between 95% to 100% RPM.

10) JETCAL ANALYZER enables engine adjustment to proper relationship between engine temperature and engine RPM for maximum thrust and efficiency during engine run. (Tabbing or Micing).

ALSO *functionally checks* aircraft thermal switches (OVERHEAT DETECTORS and WING ANTI-ICE systems) by using *TEMPCAL* Probes.

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JETCAL

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When & Where

Apr. 18-21—Society of Automotive Engineers, Golden Anniversary aeronautic mtg., aeronautic product forum and aircraft engineering display, Hotel Statler and McAlpin Hotel, New York City.

Apr. 18-22—American Society of Mechanical Engineers, 75th anniversary mtg., Baltimore.

Apr. 20-22—American Rocket Society spring mtg., Baltimore.

Apr. 21-23—Airline Ground Transportation Association annual convention, Sheraton Palace Hotel, San Francisco.

Apr. 26—Transportation Institute, Transportation Association of America, William Penn Hotel, Pittsburgh.

Apr. 24-28—Airport Operators Council annual mtg., Hotel Olympic, Seattle.

Apr. 27-30—American Helicopter Society 11th annual forum, Mayflower Hotel, Washington, D. C.

Apr. 29—Institute of Navigation's eastern regional mtg., Friendship International Airport, Baltimore.

Apr. 29-30—New England Radio-Electronics mtg., sponsored by the Institute of Radio Engineers, Sheraton Plaza Hotel, Boston.

May 2-5—Society of Aeronautical Weight Engineers annual national conference, Hilton Hotel, Fort Worth.

May 3-5—First International Aircraft Mart Exposition, Will Rogers Memorial Coliseum, Fort Worth, Tex.

May 4-5—Air Traffic Conference spring mtg., Parker House, Boston.

May 4-6—Fourth International Aviation Trade Show, 69th Regiment Armory, New York City.

May 5-7—National Intercollegiate Flying Association annual convention and air meet, Meacham Field, Fort Worth, Tex.

May 9-11—Institute of Radio Engineers national conference on aeronautical electronics, Biltmore Hotel, Dayton, O.

May 17-19—Aircraft Industries Association annual board of governors mtg., Williamsburg, Va.

May 18-19—Air Navigation Development Board radar beacon symposium, Hotel Statler, Washington, D. C.

May 18-20—California Association of Airport Executives annual convention, Long Beach, Calif.

May 18-20—National Telemetering Conference, Chicago.

May 31-June 4—Aviation Writers Association annual convention, Montreal and Toronto.

June 12-17—Society of Automotive Engineers summer mtg., Atlantic City.

June 18-25—Third annual Transcontinental Air Cruise, Palm Springs, Calif. to Philadelphia.

June 21-24— Institute of the Aeronautical Sciences and Royal Aeronautical Society joint meeting, Los Angeles.

June 21-24—Aviation Distributors & Manufacturers Assn. mid-year meeting, Brainerd, Minn.

INTERNATIONAL

Apr. 25-May 6—International Air Transport Association eighth technical conference, San Juan, P. R.

May 2—IATA composite agency committee mtg., Bermuda.

May 30—Fifth International Air Display, Ypenburg, The Netherlands.

May 31—International Civil Aviation Organization Assembly, ninth session, Montreal.

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on tour...Gilfillan GCA Quadradar

A compact "auditorium on wheels" is now touring military and civil air bases throughout the United States to demonstrate the Gilfillan GCA Quadradar. Inside this streamlined, air-conditioned truck and trailer unit is seating capacity for 12 visitors, as well as the lightweight 4-in-1 Quadradar, a communications system, power unit, motion picture projection equipment and the new Gilfillan radar trainer.

GCA RADAR AND ELECTRONICS

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LOS ANGELES

GCA

AROUND THE WORLD

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New paint prevents damage by hydraulic fluid, exhaust deposits, weathering on Douglas planes

Above right

Douglas DC-7, new record-breaking luxury airliner.

Applying Epon resin-based "Cat-A-Lac" to exterior wing section of a Douglas DC-7. Cat-A-Lac is manufactured by Finch Paint and Chemical Co., Torrance, California.

FIRE-RESISTANT hydraulic fluid, widely adopted by the airlines, attacks ordinary paint. Faced with this problem, materials experts of Douglas Aircraft Company began a search for a protective coating that would stand up to synthetic hydraulic fluid, as well as wind and rain, erosion at air speeds of 300-400 mph, and corrosive exhaust deposits.

In several years of investigation, more than 300 formulations were tested. *But only "Cat-A-Lac" formulated from Epon resins,* applied in exhaust path areas, was *100% intact after more than 1000 hours in actual airline service.*

Because of the unusual durability of Epon resin-based coatings, they have been adopted by Douglas and leading airline operators for plane areas exposed to hot exhaust gases, gasoline, hydraulic fluid and cleaning solvents.

• • •

If you want a paint that lasts longer, one that has excellent adhesion, resistance to abrasion and impact, ability to withstand extremes of heat, humidity and corrosive atmospheres . . . ask for *Epon resin coatings.* Call on our sales offices for names of suppliers. Write for the full Epon coatings story in the new brochure, "Planning to Paint a Pyramid?"

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EPON resins are the epoxy polymers made exclusively by Shell Chemical Corporation.

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AIRTRENDS

Washington, D. C., April 11, 1955

A NEW HIGH IN AIR POWER EMPHASIS dominated the scene last week as top Defense Department officials entered Senate Appropriations Committee hearings to defend Secretary Charles E. Wilson's $32.9-billion fiscal 1956 military budget request.

Air Force's $14.5-billion appropriation, Wilson said, sets an objective of 131 wings by June 30, 1956 . . . four more combat wings than the AF thought it could achieve one year ago.

Entire Air Force activity is programmed upwards toward the ultimate 137-wing, 975,000-man goals set last year. By June 30, 1956, active AF aircraft will number about 23,000 and combat units will be almost 100% jet equipped.

DESPITE SIGNIFICANT MANPOWER cuts in Army, Navy and Marine Corps, Naval air arm is slated for increase from 16 to 17 carrier air groups and addition of one attack carrier to its fleet. Active Navy inventory will be maintained at 13,000 planes—10,000 to be operated in Navy and Marine active and reserve air units. Marine Corps will continue with its present three air wings.

NEW PENTAGON PROGRAM stresses preparedness for an indefinite period. "Because of the nature of the threat," Wilson said, "there is no way to predict a date of maximum danger."

Three-point Pentagon plan will modernize Strategic Air Command and Naval Air forces. It involves replacement of B-36 with the B-52, re-equipment of longrange strategic fighter units with supersonic fighters, and equipping of new and modernized carriers with newly-developed aircraft such as the Douglas A3D and A4D and very high speed fighters like the Grumman F9F-9, North American FJ-4, and McDonnell F3H.

NEWEST TRANSPORT ORDER in the current wave of airline equipment buying is a $35,000,000 United Air Lines' procurement program due to be announced at press time. UAL purchase is understood to involve 25 aircraft, including eight DC-7s, and the remainder DC-6A and DC-6B types.

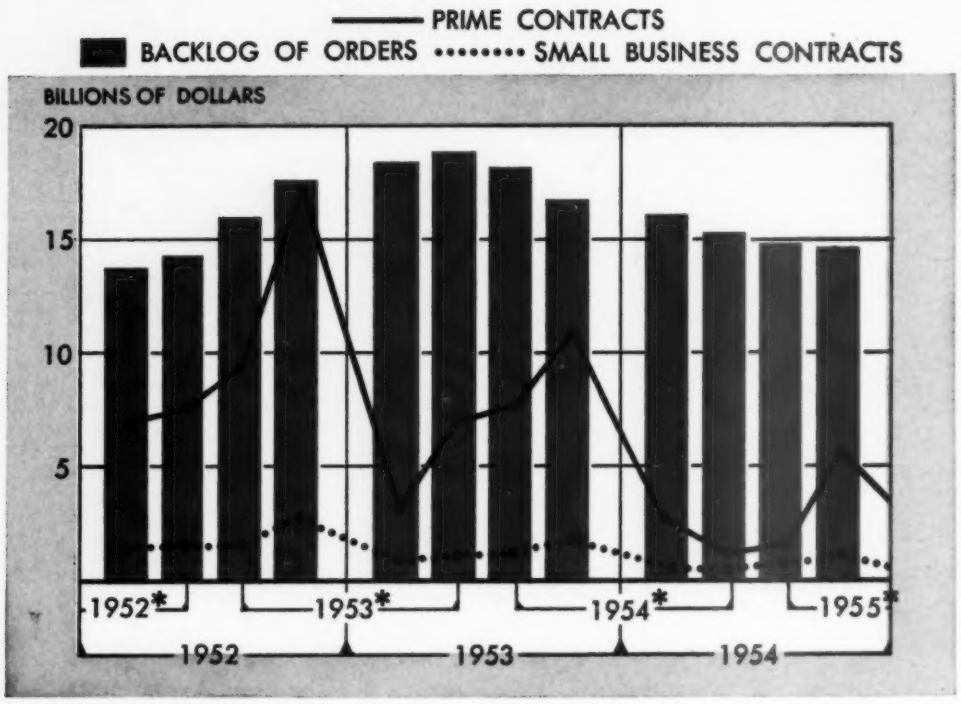
United order rounds out representation of the "Big-Four" carriers in new orders this year. Others were Eastern Air Lines' re-order of eight DC-7Bs and American's recent buying of 14 DC-7s. Announcement of Trans World Airlines' Lockheed 1649 order is expected at any moment.

Foreign airlines with outstanding orders for DC-7s now number five. Most recent is KLM Royal Dutch Airlines $31,500,000 order for 10 aircraft for delivery in April-July of 1957. Other buyers: BOAC, 10; Sabena, six; SAS, eight, and Swissair, two.

AIR MATERIEL COMMAND'S "weapons system" approach to the Convair B-58 supersonic bomber may be moving into the guided missile field, this time under sponsorship of Army Ordnance.

One of the newer additions to the growing list of missile producers, Sylvania Electric Products, Inc., reported that its Missile System Laboratory is applying the weapons system approach to a "complex problem of national defense to meet the need for thinking through in advance the strategy, tactics, and logistics of weapons while they are still in development."

The Sylvania study involves defining the nature of enemy capability, analysis of the defense needs, design of a complete system to meet the needs, and design of the electronic, missile and support equipment to assure optimum effectiveness. The company is understood to be developing a yet unnamed Army Ordnance missile.



* FISCAL YEAR

High Production Levels Whittle Down Aircraft Backlogs

SINCE 1952, the aircraft manufacturing industry has been blessed with a backlog of orders that has stayed fairly close to the $15-billion mark, despite the peaks and valleys in military prime contract awards. Aircraft production, continuing at a high level, has whittled down the backlog from the 1953 high, and in 1954 the figure dipped below $15 billion for the first time in three years.

In the accompanying chart, backlog totals are largely accounted for by military orders. Broken into its several parts, military customers ordered 87% of the propellers, 96% of the aircraft engines, an 93% of the completed aircraft. Based on the activity in recent years, it appears, that orders to be filled will dwindle very slowly, provided there isn't another Korea or Indo-China.

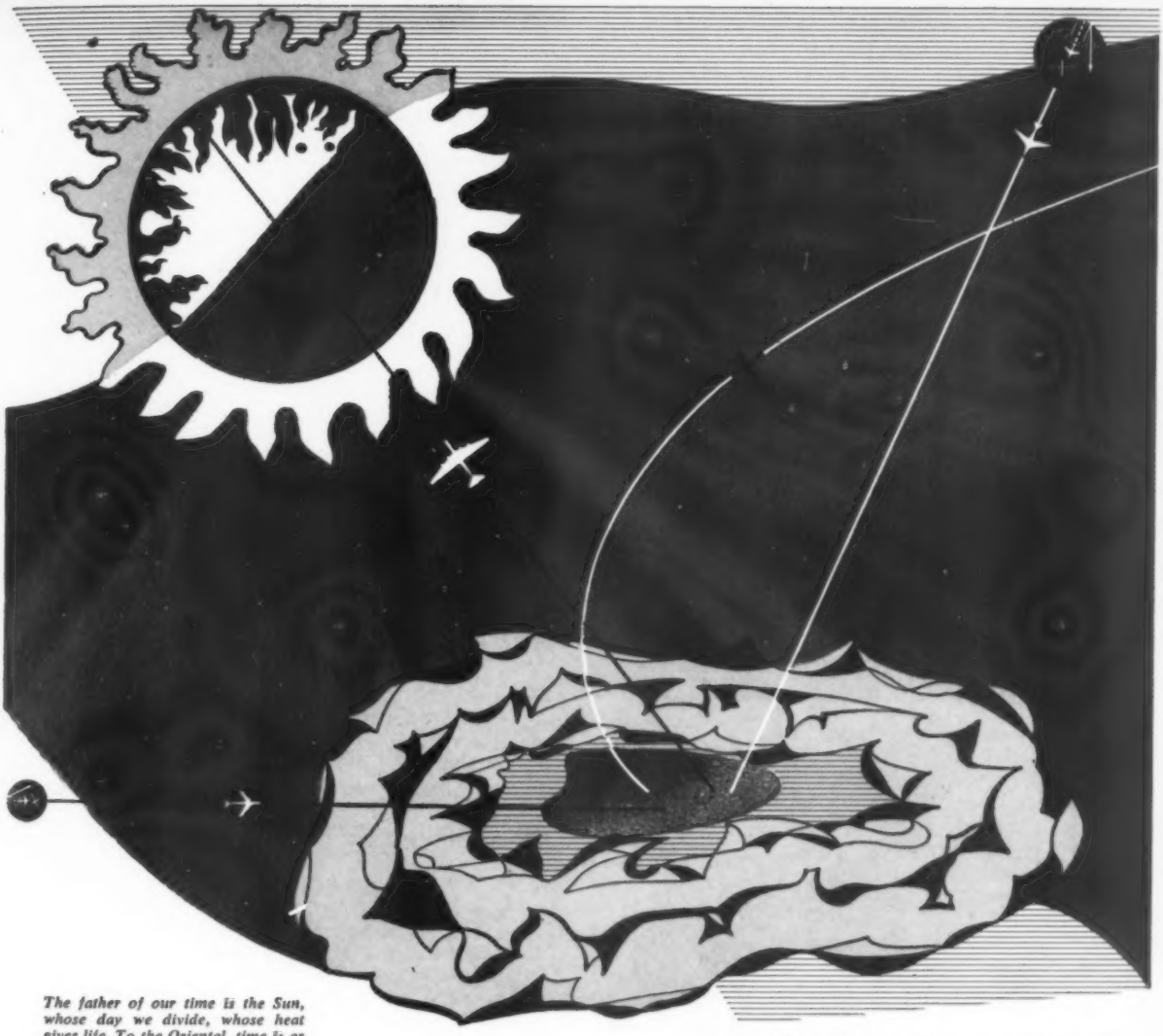
Since World War II, more and more Defense Department funds have gone for airpower. While much of the money buys planes, engines, propellers and parts, a large chunk goes for research and development. The aircraft procurement money plus some R&D funds show up in the backlog, which is based on Census Bureau reports from 52 manufacturers representing all companies known to be currently engaged in aircraft production.

Unaccounted for are large sums allocated for research by firms not usually considered in the airplane business. Some of these firms are lumped under the heading, "Small Business," and are defined as concerns with fewer than 500 employes.

Prime contracts for small business vary according to the needs of the military. When airplanes make up a large part of prime contracts, small business gets a smaller percentage, simply because such companies are too small to handle present-day military planes. For the fiscal years of 1952, 1953 and 1954, respectively, small business got 17.1%, 16.2% and 25.1% of these prime contracts: $41.2 billion, $28.3 billion and $11.5 billion. However, at the end of each of those fiscal years (calendar quarter, April-June), small business did not fare as well. Each year, prime contract awards peak in the last quarter, and while part of the increased orders wind up with small business, percentage-wise the little firms only got 15.4% of the $17.2 billion in contracts (April-June 1952), 16.2% of $10.7 billion (April-June 1953), and 20.7% of $5.4 billion (April-June 1954).

Awards of prime contracts to small business show only a small part of what these firms actually are doing. Subcontracts from large primes are even more important. In some cases, subcontracting has been almost mandatory, and by and large, the Defense Department favors all the subcontracting possible.

In the final half of 1954, prime contracts for the Air Force amounted to 30% of the total military prime contracts awarded to U. S. business.



The father of our time is the Sun, whose day we divide, whose heat gives life. To the Oriental, time is as a silent pool, and man comes and goes as do the ripples on its surface—enduring within the great continuum of creation. To the Westerner, time is an arrow, swift in flight—sure in destination, passing, ever passing on.

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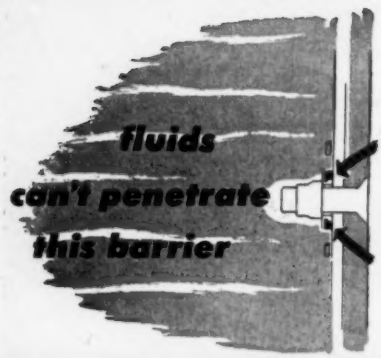

IN THIS SELF-SEALING DOME NUT

11 PRIME MANUFACTURERS Specify THIS NUT

for integral fuel tank sealing on aircraft in production

Attachment of dome nut
During attachment of dome nut, seal retracts into shell, but remains in contact with the structure. This eliminates pinching and subsequent cold flow of seal due to gaps which may exist between shell and the structure.

Installation of bolt
Installation forces the bearing surface of sealed washer to contact the structure, providing positive single point sealing.

FEATURES

- ★ **High pressure sealing without sealing compounds**
- ★ **Inseparably self-contained assembly**
- ★ **Single point seal**
- ★ **Floating nut with stationary seal, unaffected by successive bolt installations**
- ★ **Reduces Installation Time Weight and Maintenance**

SPECIFICATIONS

Self locking nut conforms to applicable requirements of AN-N-5. Floats .025 in all directions.

BUNA-N type seal conforms to requirements of MIL-R-6855 for aircraft fuels Type 1, 2 and 3. It is also resistant to air, salt water, oil, gasoline and most organic solvents. Temperature range: −80°F to +225°F continuous operation. Pressure range ±50 psi constant or fluctuating operation.

SILICONE type seal. Resistant to hot air, ammonia, synthetic oil. Temp. range −80°F to +450°F continuous operation.

The range of materials and sizes now available has been greatly expanded. Pick the part number that meets your specific requirements from the following chart of production types.

Thread Sizes	Steel shell & nut; aluminum washer; Buna-N seal	Steel shell, nut & washer, Silicone seal	Steel shell aluminum nut & washer; Buna-N seal	Corrosion-resistant steel shell & nut; aluminum washer; Buna-N seal
6-32 NC-2	4630H-62	4630HA-62	—	4730H-62
8-32 NC-2	4630H-82	4630HA-82	—	4730H-82
10-32 NF-3	4630H-02	4630HA-02	—	4730H-02
¼-28 NF-3	4630H-048	4630HA-048	4530H-048	4730H-048
9/16-24 NF-3	4630H-054	4630HA-054	—	—
5/8-24 NF-3	4630H-064	4630HA-064	—	—

NOTE: Any combination of shell, nut, washer and seal materials shown above can be readily assembled for your specific requirements.

Also available in special gang channel designs.

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Manufacturers of self locking anchor nuts and special fasteners.

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MODERN MULE for uranium prospectors is the Bell 47G, with Scintillometer, portable diamond core drill, other tools. To promote the idea Bell Aircraft has established a subsidiary, the Bell Exploration and Development Corp.

BUSINESS

Lockheed's Gross Warns

Industry Challenged by New Firms

AIR DEFENSE manufacturing may become a field for shoemakers, singers and other non-aeronautical interests, the industry has been warned by Robert E. Gross, president of Lockheed Aircraft Corp. Gross, in a speech before a meeting of the Institute of the Aeronautical Sciences, listed such newcomers to the industry as Bing Crosby Enterprises, United Shoe Machinery, General Mills and Minnesota Mining & Manufacturing. Out of a group of 24 air defense projects, he declared, prime responsibility went to non-aircraft manufacturers in 15 of the cases.

"The aerial weapon may center in the aircraft industry or it may go to the 'jack-of-all-trades' type of companies," said Gross. "It is a great change that is taking place in our industry. We can't be just an airframe company. We have to become an aircraft or an aviation company."

On the civil side of the industry, airlines querried by *American Aviation* were not yet ready to commit themselves on the question of when they would order jets or turboprops. United Air Lines came closest to offering a prediction: "It may be that a decision on this major equipment issue will be required during the next 12 months." In a choice between the two types, the jet would come closest to filling UAL's needs, answered United president W. A. Patterson. Turboprops found a supporter in American Airlines, which replied that it "may" order some, but that it has no plans to order jets.

Other carriers avoided even such tentative predictions, though non-scheduled North American Airlines foresaw a prospect of operating the Boeing 707 non-stop coast to coast at a $75 fare and said that it anticipated being "among the first" to place jet or turboprop orders when the time was ripe.

If none of the carriers places such orders before the end of 1956, the scheduled airline fleet is still due for an expansion of more than 30%. An estimated 450 postwar aircraft were in that fleet at the end of last year; during this year and next the carriers are due to take delivery of 146 more, bringing the total to 596 postwar transports. Total cost: over $748 million.

PROFIT & LOSS

Firm	Period Ended	Current Net	Previous Net	Earngs./Common Share Current	Previous
Gen. Dynamics	Yr. 12/31	$20,795,472	$13,193,866	$4.72	$3.37
Martin	Yr. 12/31	20,052,315	15,094,756	7.85	7.06
Minn.-Honey.	Yr. 12/31	15,345,203	10,329,825	....	....
Northeast Airl.	2 mos. 2/28	(—)177,928	(—)114,745	....	....
Northwest Airl.	Yr. 12/31	2,415,524	1,944,693	2.38	....
Pacific Airmot.	Yr. 11/30	(—)128,338	344,780	....	....
Republic	Yr. 12/31	8,967,523	8,314,301	6.71	6.83
Sperry Corp. (prelim.)	Yr. 12/31	28,500,000	15,800,000	6.55	3.79
TWA	Yr. 12/31	10,336,132	5,064,392	3.10	1.52
Unit. Air. Corp.	Yr. 12/31	25,996,232	21,193,733	7.65	6.22
Fairchild	Yr. 12/31	4,134,015	4,013,541	1.43	1.74
Bell	Yr. 12/31	6,404,243	3,465,423	2.85	1.96

DIVIDENDS

Firm	Period	Amount	Payable	Record Date
Bendix Aviation	....	Stock*	3/19	3/4
* One additional share of common for each share held				
Jack & Heintz	....	20¢	5/1	4/15
Jack & Heintz cum pfd	Q	50¢	7/1	6/15
Republic Avia.	....	$1.00	4/15	3/31
Kaman	....	10¢	4/15	4/5
Northwest Airl.	....	20¢	....	....
Northwest Airl. 4.6% cum pfd	....	28.75¢	5/1	4/15

CONTRACTS

• **General Electric** has been informed that 1600 fewer J47 jet engines than planned will be needed by the USAF in 1956. Long life of existing engines was cited by G. E. as the reason for the $80 million reduction.

• **Northeast Airlines** has purchased 10 Douglas DC-6B's, with deliveries scheduled to begin in January, 1957. Total cost, including spares: $14 million.

• **Curtiss Wright's Propeller Div.** has received two USAF contracts for a total of $16 million, covering propeller assemblies and spare parts.

• **Servel, Inc.**, Evansville, Ind., is to build $15 million worth of wings and other components for the Republic F-84F fighter-bomber. The firm was recently described as probably "the largest producer of military jet fighter airplane wings in the free world."

IN THIS ISSUE . . .

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TWIN COACH

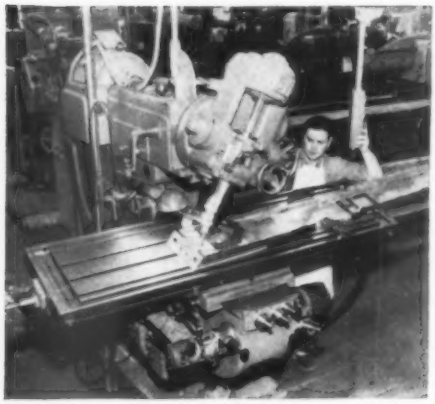
helps give the Sabre its edge

Famed for its combat superiority with the United Nations in the skies over Korea, the Sabre Jet is now being supplied to other NATO countries.

Twin Coach Aircraft Division was selected as a subcontractor for large and intricate machinings for the F-86 as well as for North American Aviation's other high-performance aircraft, the F-100 and FJ4.

These important assignments are typical of the way in which leading airframe manufacturers rely on Twin Coach as a source of major airframe assemblies.

If you have an assembly you're considering subcontracting, call Twin Coach for consultation. Our *aircraft* experience . . . our 23½ acres of plant and facilities are at your disposal.



Twin Coach Aircraft Division plants turn out wing spars, main wing panels, flaps, complete center sections with plumbing and electrical wiring, and other large assemblies.

OTHER DIVISIONS OF TWIN COACH COMPANY MAKE: *Fageol Van and Pony Express Trucks, Fageol Gasoline and Propane Engines, Fageol-Leyland Diesel Engines.*

TWIN COACH COMPANY
Aircraft Division BUFFALO, N.Y.

TWIN COACH AIRCRAFT DIVISION MAKES ASSEMBLIES FOR BOEING, CESSNA, GRUMMAN, NORTH AMERICAN, REPUBLIC, AND CLASSIFIED EXPERIMENTAL AIRCRAFT TYPES. AA-138

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Production Spotlight

• Convair's 19-inch Charactron cathode ray tube for use in a longrange air traffic control system, is in production at a rate of five tubes a day. Tube displays flight number, airline name, altitude, speed and location information, or it may be used as a plan position indicator using information from a transponder in the plane.

• First prototype of Chance Vought's new XF8U-1 Navy day fighter is expected to fly this summer. It will be powered by a Pratt & Whitney J57. Company says the F8U-1 development program included the first thorough use of a flight simulator to determine stability and control characteristics prior to first flight.

• Republic Aviation Corp.'s F-105 fighter-bomber, powered by two Allison 10,000-lb.-thrust J71s, is expected to fly this year. Republic also reports progress on its advanced experimental F-103 interceptor which is scheduled to get a 15,000-lb.-thrust Wright J67.

• Transcendental Aircraft Corp. of Glen Riddle, Pa. has flown its Model 1-G convertiplane (above) with rotors tilted 35° forward from vertical helicopter position, reportedly demonstrating excellent controllability without

vibration. During 100 flights and 60 hours of testing, the 1-G has reached 3,500 ft. altitude and 115 mph speeds as a helicopter. Goal for this model is 150 mph, but larger-prop versions on the drawing board are expected to exceed 250 mph.

• Air Force has ungrounded the Martin B-57 after an inspection and cleaning of certain electrical components. The light bomber was grounded at Martin's request after two of the planes crashed in two successive days.

• More than 150 hours of test time have been logged by the Grumman F9F-9 in the variable density windtunnel at Cornell Aeronautical Laboratory. All of the tests on the new Navy supersonic fighter were in the transonic speed range. Grumman reportedly has a couple more new fighter designs on the drawing boards.

• Glenn L Martin Co.'s newest version of the B-57 is a company-designed configuration with new wing and probably will be powered by Pratt & Whitney J57 engines. Latest announced version is the B-57E, a high performance tow target vehicle.

• Bell Aircraft Corp. has a new highspeed reconnaissance bomber on the drawing boards.

• Glenn L. Martin Co. is in the forefront among airframe companies in developing automatized electronic production techniques. Working with the "insertion" and American Car & Foundry's modular techniques, and using United Shoe Machinery equipment, Martin is interested in automatic production techniques that meet the more stringent vibration and temperature requirements of airborne equipment.

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Personal View

By WAYNE W. PARRISH

Cinerama Treatment for Airport Aid

NINE YEARS AGO in 1946 Congress enacted a federal aid airport act which authorized $500 million to be spent in matching funds prior to expiration of the act on June 30, 1958.

Through no fault of the farseeing and generous Congress, the program which got off to a pretty fair start, then began sagging progressively until it hit a rock bottom zero in 1954. The ten years are almost up and only $214 million has been spent, of which $22 million went for administration.

The Korean war was used as an excuse to bottle up the funds for a couple of years and then along came the Eisenhower Administration which installed an Under Secretary of Commerce for Transportation by the name of Robert B. Murray, Jr. who did nothing but drag his feet when it came to helping civil aviation.

Now a new Under Secretary of Commerce for Transportation has taken over by name of Louis S. Rothschild who has been a business success in life and isn't afraid of doing things. So, there is a chance that something will be done about improving a lot of airports and making up for time lost.

Nobody knows for sure how much money is needed to bring the airport system up to date under the matching system, but $100 million from the federal government and another $100 million locally seems to be a reasonable estimate except that this work should have been done day before yesterday.

Thanks to the American Municipal Association, a reasonably good barrage of requests for urgency has been hitting Congress lately, except that it isn't Congress, but Commerce, that has dragged its feet. It would be helpful if the two airport organizations would speak out a little more clearly, too. The Airport Operators Council is a rather potent outfit, and, until the past year, so has been the American Association of Airport Executives which got segregated from the lifestream of national activity in more ways than just geography.

But there's another important angle which we hope Mr. Rothschild won't overlook, since he also is chairman of the all-important and all-government Air Coordinating Committee. There's an organization called the Airport Use Panel, a component of the ACC, which was established to try to iron out differences between civil and military interests on specific airport problems. But all of the members were government officials, except for one period when an airport official sat as chairman to represent industry.

The general idea of an Airport Use Panel is good, but only if industry is well represented and only if the Panel isn't merely used like a fire engine to extinguish emergencies after they've happened. A few months ago industry groups were formed into an advisory committee for the Panel, but without the ability to participate in advance planning alongside the military, the effectiveness of the Panel is thusly negated. The time to tackle airport problems is in advance, not after they exist. The NAV Panel advisory committee has functioned rather well in this respect, so there is no real reason why the same system can't be used for airports.

If the Airport Use Panel can be broadened in scope, then there would be no need to revive the ill-fated Airport Advisory Committee which former Under Secretary Murray set up last fall as a mild rubber stamp to big plans which never materialized.

We think Mr. Rothschild will lend a sympathetic ear to the airport federal aid problem. Something must get moving. The driblets of money appropriated in recent years were hardly worth the bother. It's time to get the program on a wide screen. Mr. Murray looked at it through a microscope. We hope Mr. Rothschild views it like Cinerama.

Giving TACAN the Spotlight

A FAIR MEASURE of the rumpus stirred up by the TACAN VOR/DME controversy can be found in the unusual action now under way in Congress to create a Joint Committee of the Senate and House to study the whole problem of a common system of air navigation. So many different committees of Congress were starting their own inquiries, and the international implications were so broad, that a joint committee seemed to be the only answer to the flurry of investigating activity.

This is the first time in many years that a joint committee of Congress will be studying aviation matters. With a probable $125,000 available, the committee would be expected to delve pretty deeply into the mysteries behind the sudden TACAN push. In any event, an interim report is to be ready by June 30 and a full report by the end of the year. It will perhaps be the most engaging aviation performance to hit Washington for quite some time.

Major Shakeup

MILITARY INFORMATION may be much more restricted than in the past under Secretary of Defense Wilson's two sweeping directives ordering a one-third cut in public information personnel of the three services, and substituting civilians for officers as directors of the three public information divisions. Although the military have taken the directives hard, they can thank themselves for some of the causes. It is no secret that public information offices (except Navy) have been overloaded and many personnel classified with other titles to cover up. It is no secret either that military personnel have written too much (for pay), spoken out of turn too much, and (with a few notable exceptions) haven't handled public relations with much experience or finesse.

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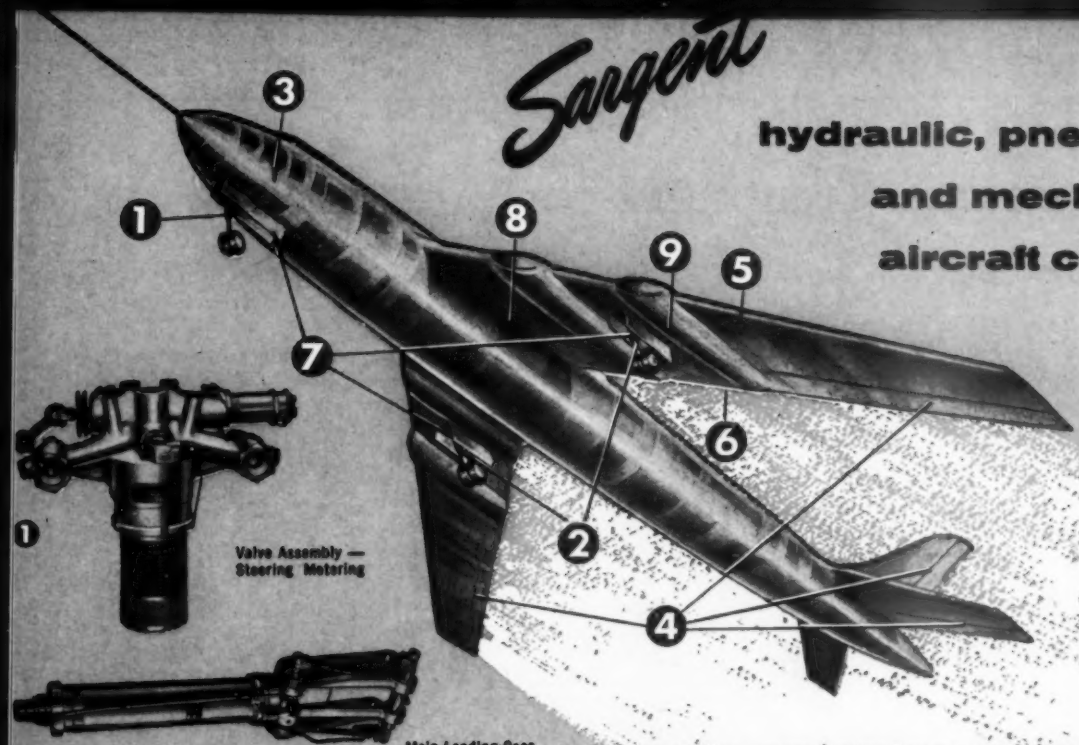
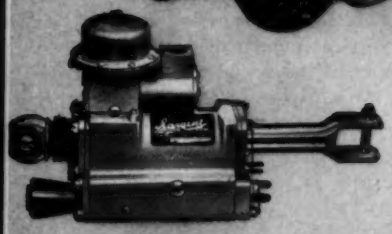


1 Valve Assembly — Steering Metering

2 Main Landing Gear Retractor

3 Brake Valves



4 Power control units for rudder, elevators and flaperons

5 Slat Actuating Cylinder

6 Gear Box Assembly — Outer Wing Flap Drive

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Sargent Engineering has developed the "know-how" to aid in the solution of difficult problems. Send your specifications for our proposal.

Write today for your copy of the illustrated story of Sargent's organization, methods and manufacturing facilities.

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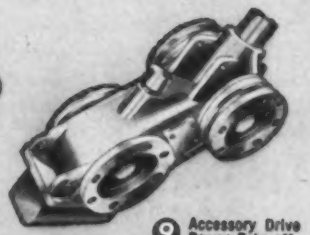
8 Spoiler Valve



9 Accessory Drive Power Take-off

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"Good will" is the disposition of the pleased customer to return to the place where he has been well treated.
—U. S. Supreme Court

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Air Force Places First Northrop F-89H Order

Northrop Aircraft, Inc., has received an initial Air Force order for the F-89H, new version of the Scorpion.

Commerce Department's synopsis of contract awards shows that total value of the initial order was $2.22 million for "requirements to reflect data to F-89H aircraft, training, parts and equipment." No details of the new version have been released.

Northrop's only production plane at present is the two-place F-89D interceptor, scheduled for phaseout within 12 months. The company also has a missile project, the Snark SM-62 strategic intercontinental weapon.

Convair Gets $15-million Contract for F-102A

Convair Division of General Dynamics Corp. has received a $15-million additional Air Force contract for an unspecified number of F-102A interceptor aircraft, spares and related items.

Other recent contracts, revealed by Commerce Department's daily synopsis of defense awards:

North American Aviation, $12.6 million for 215 unspecified aircraft and related items.

Sikorsky Aircraft Div., United Aircraft Corp., $3 million, for 55 H-19D helicopters, spares and data.

EAL Officials Visit West Coast

A team of high-level visitors from Eastern Air Lines, headed by board chairman E. V. Rickenbacker, arrived on the west coast recently to discuss equipment with Douglas, Convair, and Lockheed. The group, which arrived shortly before the rollout of EAL's first DC-7B, included first vice president Paul Brattain, vice president of operations S. L. Shannon, vice president of engineering Charles Froesch, director of engineering and maintenance A. L. Chabot, chief engineering pilot F. E. Davis, and others. Talks on turboprop and turbojet transport replacements for current equipment were expected to be a feature of the visit.

Air Mail Profit for Post Office Reported

Domestic air mail brought the Post Office a profit of $3.6 million in fiscal 1954, according to the P.O.'s Cost Ascertainment Report, just released. Revenues amounted to $133.5 million, with costs of $129.9 million.

International air mail and air parcel post were almost as profitable, with revenues of $38.2 million and expenses of $34.8 million, a $3.4 million profit.

Saudi Arabia Buys Six Convair 340's

Six Convair 340's have been ordered by the Saudi Arabian government. The planes will be supplied from the group of 33 already on order for the Air Force, delaying completion of the USAF deliveries somewhat. The aircraft will be used in standard 44-seat configuration for pilgrimage flights to Mecca.

AFL Completes C-46 Flight Tests

Aircraft Engineering Foundation has concluded a 176-hour CAA flight test program on its modified C-46 transport and is now reducing flight data in preparation for CAA/CAB approval. Tests indicate the reworked airplane will meet requirements at a 47,000 pound gross weight, AEF president Monte H. Snedeker reports.

Foundation plan is to demonstrate the test aircraft to CAA, CAB and U. S. Air Force officials in Washington this week. Later in the month it will be flown to Teterboro (N. J.) Airport and Miami for inspection by irregular air carrier members of AEF at those points.

CAL Takes Over Pioneer

Continental Air Lines' acquisition of Pioneer Air Lines became official on April 1 with the issuance by CAB of a new certificate to CAL incorporating Pioneer's local service routes.

The Board action followed notification from the two carriers that all steps necessary to the transaction had been completed.

Last major obstacle to the deal was removed on March 29 when a three-judge U. S. Court of Appeals in New Orleans refused a request by Braniff Airways for a stay of CAB approval pending further court investigation.

Spain Builds U. S. Planes

Spain's three principal aircraft manufacturers are to be prime contractors in a program for the major maintenance and manufacturing support of the Spanish Air Force's American aircraft. Construcciones Aeronauticas will provide depot-level maintenance and manufacturing support for the F-86; La Hispano Aviacion and Aeronautica Industrial will do the same for the T-33 and T-6 respectively.

JET FLAMES light up California sky as Navy pilot turns on afterburners of twin Westinghouse J46 engines in Chance Vought F7U-3 Cutlass preparatory to pre-flight check at NAS Moffett. Plane is attached to Composite Squadron Three.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

World's first 300 mph airplane tire —and it's B. F. Goodrich Tubeless!

B. F. Goodrich, inventor of the Tubeless Tire, announces a great new aviation advance—the world's first 300 mph airplane tire. Developed for ultra high speed military use, the new Tubeless Tire established the record for a high speed landing on B. F. Goodrich's new 300 mph dynamometer in Akron, shown above.

To simulate the complex stresses of actual landings, this new B. F. Goodrich 300 mph Tubeless Tire was set to hit the dynamometer's flywheel at an angle. Slammed against the whirling flywheel under 10,000 lbs. load, it instantly developed speeds up to 4,000 rpm—a combination of impact, friction and centrifugal force that would disintegrate an ordinary tire. After this 300 mph landing, the new Tubeless Tire showed no sign of failure. More landings were made, surpassing requirements for the tire. And even after 14 straight landings at 300 mph, the tire was good for more.

The new 300 mph tire is the latest addition to the B. F. Goodrich airplane Tubeless Tire line. Already in military and commercial service, B. F. Goodrich Tubeless Tires speed maintenance, cut weight—saving as much as 75 per cent of tube weight. They give safer take-offs and landings because tube troubles are eliminated.

Instead of an inner tube, the BFG Tubeless Tire has a patented inner liner that's part of the tire itself.

Result: There's no tube to blow out. No tube to add weight. And there's only one unit to mount and warehouse.

This new 300 mph Tubeless Tire is another example of B. F. Goodrich leadership in Tubeless Tire research and development. *The B. F. Goodrich Co., Aeronautical Sales, Akron, Ohio.*

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AF Switches Policy on Jet Maintenance

New Contract to Southwest Airmotive Signals Change That Could Mean Millions to Private Industry

By LOIS PHILMUS

The change in Air Force contract maintenance policy, heralded by a $3-million jet engine overhaul contract to Southwest Airmotive (AMERICAN AVIATION, Mar. 28, p. 23) offers the private maintenance industry one of its greatest potentials in many years.

The decision to allow civil bases to work on jet equipment will have a three-fold reward:

• **(1) Additional business** that could run up into multi-million dollar category.

• **(2) Replacement business** as piston engines go into a secondary position.

• **(3) Experience on jet equipment** that will be of inestimable value when commercial jets go into service.

Originally, AF contract maintenance was restricted to reciprocating engines up to the R-2800 class. But under the Defense Department directive that the military would finance no new "brick and mortar" when comparable facilities are or could be made available in private industry, the switch was decided upon. The expansion to jet equipment was accelerated by the constantly shrinking military depot space caused by newer type jets being phased into service.

Col. Keith W. Dech, head of program planning for AF maintenance engineering, said the contract award to Southwest for overhaul of more than 1,200 Allison J33s will enable the phase-out of J33 overhaul at the AF's Middletown, Pa., facility, providing much-needed space for maintenance of more complicated engines.

If the "pioneer" test contract with Southwest proves out as expected, more contracts will be let. Dech expects the SAC operation will be watched for about a year before the program goes any farther, but this apparently is not ironclad and earlier contracts have not been ruled out. It is a "wait and see" situation.

• **What qualified firms** have to look forward to is this: The Air Force currently has in service eight different jet engine models with at least three more in various stages of development that will be pegged for service within the next 18 months to three years. In greatest use today are the Allison J35 and General Electric J47.

As newer models are phased in, civil facilities, under the present concept, will be drawn upon to supplement Air Force depots. The Continental J69 could well offer a new market. To be used on the Cessna T-37 trainer, the J69 can be a likely candidate for civil overhaul, since it is a simple 1,000-lb.-thrust model, less complex than others.

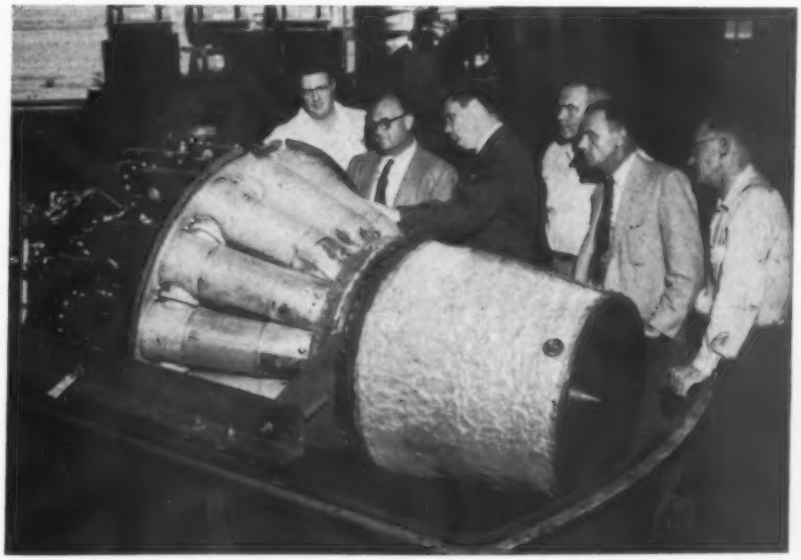
Southwest is carrying a heavy responsibility. It's success or failure can effect not only its own future but the future of the whole program. The firm won the J33 contract over bids made by manufacturers, airlines and another overhaul base. This, incidentially, will be the procedure followed on later contract bid—invitations will be sent to all interested segments of industry.

Another precedent being set is the inclusion of accessories for overhaul along with the engines. Prime manufacturers have done some overhaul on jets, excluding the accessories.

• **To meet the challenge,** SAC is expanding its facilities to the tune of $1 million—all private investment, no government aid. A 60-foot extension is being added to its new enlarged engine division facility at Dallas' Love Field and ground has been broken at Fort Worth's Amon Carter field for a 10,000-square-foot testing and shop building. Although certain specialized tooling is being supplied by the Air Force, the firm will supply the major portion of the tools and equipment which will be of a universal type, suitable for turboprops as well as other types of jet engines.

SAC has retained a Dallas jet test cell manufacturer to design and build its test facility at Amon Carter. It has hired Dr. Wayne Rudmose, physics professor at Southern Methodist University and a member of the Committee on Hearing and Bio-Acoustics, to be soundproofing consultant.

About 200 additional technicians will be hired, thus nearly tripling the current 120 engine division staff. James F. Wall, assistant division superintendent, will direct jet overhaul operations. Training of the staff will be intensive. Five-man teams, made up of supervisors and lead men, have been scheduled for two-weeks training sessions at Middletown. About four teams already have completed the indoctrination.



FIRST JET POWERPLANT ever consigned to a commercial facility under USAF contract, an Allison J33, is shown on arrival at Southwest Airmotive for employe training and familiarization. Shown inspecting the shipment is J. E. Lockhart, Jr., treasurer; Winston Castleberry, vice president; Lt. Col. C. C. Pratt, Dallas Air Procurement District chief; James Wall, assistant superintendent of SAC engine division; Clyde E. Harwell, Dallas Air Procurement District contract officer, and Louis Beimer, superintendent of Southwest Airmotive's Engine Division.

Factory representatives of Bendix Products, Eclipse Pioneer and Scintilla divisions of Bendix Aviation Corp., and the Pesco Products Division of Borg-Warner Corp. will come to Dallas to provide additional training on J33 accessory and component overhaul. Factory visits will be made as necessary.

• **Production is scheduled** to get under way by mid-summer and will continue more than a year. Winston Castleberry, SAC vice president in charge of service, has stated that production of piston and jet engine overhauls will be "side-by-side" in receiving, tear-down, and cleaning department, but definitely will be separated in inspection, rework, assembly and testing and in stock-keeping and records.

The company presently is engaged in the overhaul of piston engines under USAF contract, but will phase out by September. At that time, it will have overhauled more than 6,000 USAF conventional engines since receiving its first contract in June 1950.

An authorized distributor and service station for Pratt & Whitney and divisions of Bendix, SAC will continue its services to private and commercial engine owners. There will be no interruption, Castleberry points out, in its "one-stop service" for business and executive airplanes.

"We feel this contract opens a new and challenging era, not only for us but for commercial aviation everywhere," Castleberry said. "We recognize in it a great responsibility both to the Air Force and to the industry generally." • • •

Airframe, Instrumentation Designs Years Apart

By HENRY P. STEIER

MILITARY AIRCRAFT PERFORMANCE and their operational flight conditions have outdistanced the instrumentation intended to aid men in flying.

The U. S. Air Force is taking a serious look at the inadequacies of low and highspeed aircraft instrumentation in operational use. Recently, instrumentation criticisms and ideas from the major commands, with an assistance from representatives of the Civil Aeronautics Administration, four airlines, Navy and Marine Corps and Hughes Aircraft, were shared at a symposium held at Moody AFB, Ga.

Referring to the problems in instrumentation posed by the second "hatch" of aircraft, Maj. Jarred V. Crabb, symposium chairman, said, "We are already behind, and the third 'hatch' is ready for study."

Defining conventional aircraft (propeller driven, helicopters and below Mach 1 jets) and highspeed high-altitude aircraft as two separate categories, a seminar on each was held to determine long- and short-range approaches to the provision of adequate instrumentation for first line AF planes.

Specific planning factors bearing on the problem of improved instrumentation were reported to be:

• **Non-standard arrangement** of instruments on cockpit panels, a situation that is reported to confuse pilots charged with day after day operation of the same aircraft. The differences extend to models and even series of the same aircraft. Seminar participants agreed that lack of a standard arrangement can be assumed to have been "an indirect, if not direct, cause factor in the loss of aircraft and crews" attributed to "pilot error."

Recommendations urged that instrument arrangements be standardized immediately, and that retro-fitting be done during the regular inspection and repair period

• **Procurement time lag,** both of availible new instruments and of those to fit a new plane's projected charateristics. Calling it "unrealistic" to produce a new type of aircraft and expect old instruments with known deficiencies to perform an impossible task, the seminars recommended that "aircraft instrumentation developments be phased with development of the specific aircraft," and be given the "same priority as the aircraft itself."

It also was recommended that each major command establish an active

NORTH AMERICAN F-100, operational in 1955, has same basic instrumentation as . . .

LOCKHEED F-80 Shooting Star that made its first flight in January 1944.

program to keep the AF advised of their changing instrument requirements, and be required to furnish representation to the Major Commands Crew Station Advisory Board at Wright Air Development Center.

It was further recommended that if the representatives be members of the Mock-Up and Commands Characteristics and Configuration Boards, the "best thinking of the designer and operator can be combined to give us superior equipment in a much shorter time."

Cited were Mock-Up Board decisions in the past that were based upon individual preferences or personal opinion. It was claimed that ". . . many of our glaring deficiencies" are a "direct result of this method of procurement."

The F-100 was given as a specific example of "obsoletely" instrumented aircraft. Despite a span of 11 years between the first operational use of the F-80 and F-100, both planes are provided with the same basic instrumentation, with little improvement in either instrument performance or display method.

For example, although the rate of climb has increased ten-fold, vertical speed indicators and the principles of displaying attitude information are unchanged.

The seminarists recommended determination of whether adequate financial suport is being applied to "insure that airborne instrument development keeps pace with airframe advancement," and that instrumentation requirements are included as part of all proposed airborne weapons systems.

Hughes Aircraft Corp., represented at the symposium by Dr. Stanley N. Roscoe, is working on the program of cockpit research. Their program, based upon human engineering studies, promises some revolutionary approaches to the necessity for rapid information access to pilots.

• **Deficiencies in present** instruments were reported in detail, both as they effect safe conduct of mission and effective utilization of airspace:

Altimeter systems were said to be not accurate enough to permit safe instrument let-down to less than 200 feet, and present the possibility of being misread at 10,000 feet. At high altitudes, errors as large as 800 feet were reported as common. Altimeter unreliability has required the Air Tactical Command to specify a 2,000-foot separation between consecutive flight altitudes above 29,000 feet to insure safety.

Pilots were reported on occasion to have flown "into the ground due to misinterpretation" of altimeter readings. A new altimeter, the MA-1 (plus or minus 180-foot accuracy at 30,000 feet), was referred to as a partial answer to the problem of misreading, but is not available in quantity for conventional aircraft because of its urgent requirement in high performance jet aircraft.

Immediate retrofit of a new type 10,000-foot indicator on present altimeters, and investigation of pitot-static system position errors were recommended. A second program to correct altimeter system error was mentioned. It consists of improving the pitot-static component by incorporation of a static source compensator that feeds angle of attack information into a computer.

A more easily read counter altimeter has just been announced by Kollsman. The result of Aero Medical Laboratory research, it is said to be "extremely accurate throughout the entire altitude range," and impervious to high g-loadings during maneuvers at jet speeds.

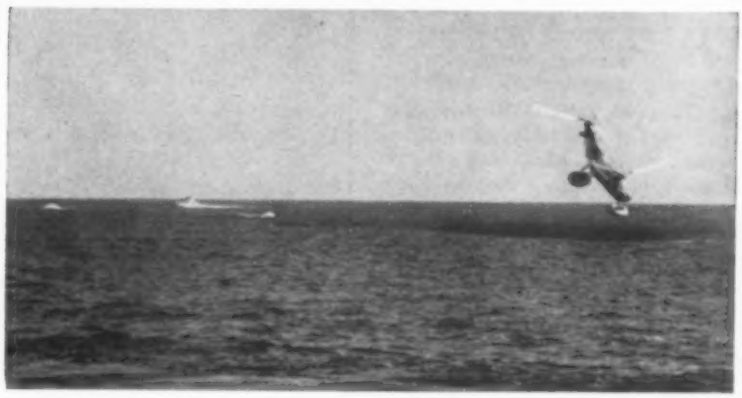
• **Attitude indicator J-8** was considered "generally inadequate for use in conventional aircraft because of gyro precession and interpretation errors," although it "would be satisfactory on the co-pilot's panel until such time as sufficient quantity of improved indicators is available for complete replacement."

The highspeed aircraft seminar reported that "erection time on the J-8 is of such duration that on scramble missions pilots are required to make instrument takeoffs prior to established time of reliability."

• **Heading indicator C-5** was called "seldom used" and unreliable. Requirements for a replacement instrument were given as readability to one degree, and "absolutely minimum precession."

• **Vertical Speed indicator** used is limited to plus or minus 6,000 feet per minute. Since jet aircraft exceed these limits constantly, and because of instrument lag, the indicator is deemed unreliable. The seminar called for an instrument giving accurate indications to 30,000 feet per minute, with an expanded scale between 0 to 1,000 feet per minute. Immediate action was asked on procurement of an improved instrument in all first line and training aircraft.

• **Machmeter accuracy** to 0.002 was reported to be essential for cruise control. During discussions with pilots who fly the B-47 nuclear weapons carrier and B-52 types, it was said that the only way to fly at a steady



Copter Speeds Minesweeper Operations

Navy Bureau of Aeronautics and Piasecki Helicopter Corp. have disclosed new combat techniques by which helicopters will sweep enemy minefields faster and safer than surface vessels.

Tests conducted by Piasecki since 1952 under contract with BuAer Armament Division showed that its HRP-1 helicopter could sweep minefields at speeds comparable to minesweepers. Furthermore, it could tow sweep gear in seas too rough for surface craft.

Later testing with Piasecki's H-21 helicopter revealed it could better the speed of Navy minesweepers. Superior maneuverability of the helicopter in sweeping restricted areas and in reducing turning radius proved it possible to complete the operation in less time.

Advantage of the helicopter is that it eliminates the danger of moored mines, that faces lead minesweepers when entering a field.

In a tactical operation, the copter could be used to sweep the initial path through the minefield without threat of destruction. Then, with the danger of moored mines removed, a formation of minesweeping vessels could follow and sweep the remainder of the minefield in safety.

climb is with the Machmeter, and if the rate is off by 200 feet it costs 6% of the plane's range. Procurement of a new Mach number/airspeed indicator was urgently recommended.

• **Tacan or VOR/DME navigation** systems were recommended for installation "as soon as possible." For efficient utilization of airspace, the ATC requires a system providing the pilot with continuous visually displayed distance-measurement, as well as azimuth. High speeds of new jet aircraft require a far greater horizontal space between aircraft at the same altitude. "The ten-minute separation required by Air Tactical Command means 30 miles on a C-47, but 80 miles on a fighter."

F-100 aircraft coming off the production line were reported to be equipped with "nothing but the ARN-6 low-frequency radio compass for navigation." That instrument is said to be extremely susceptible to precipitation static, and its use hazardous even under moderately adverse conditions. The ARN-14 and ARC-27 OHF systems were recommended for immediate replacement of ARN-6 and ARC-27.

• **Special navigational requirements** were reported to exist that call for an accelerated test program for the lightest, largest capacity computer in the cockpits of all strategic and tactical fighter aircraft. • • •

CAA Committee Studies Industry's Safety Role

CAA Office of Aviation Safety has established a four-man committee to start planning for increased assumption of safety responsibility by industry.

The committee is to formulate reccommendations to be presented to Safety Director A. S. Koch by May 1. Consultations with industry are scheduled to take place after July 1, pending budget authorization of about $40,000 for the survey. Koch has notified industry of the undertaking, and has told various associations they may find it advisable to obtain preliminary opinions from industries they represent.

The mission of CAA's committee is "to develop a comprehensive body of concrete proposals" pertaining to:

• Aviation safety activities for which the primary responsibility should be *transferred* to industry or private parties, including quite possibly some that are now handled through delegation.

• Safety activities which should be *delegated*.

• Activities that should be *eliminated* or substantially reduced.

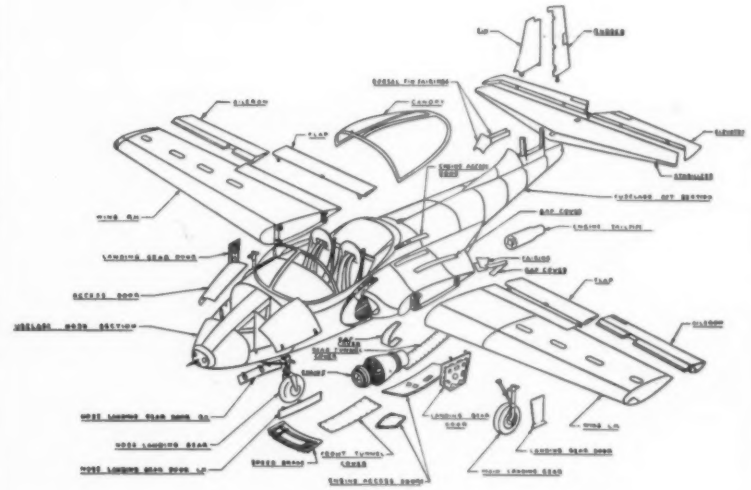
• Basic changes in the direction, management, approach and manner of execution of safety activities which would improve efficiency and economy.

Members of the committee include W. H. Weeks, chief of the aircraft engineering division as chairman, with E. B. Franklin, air carrier safety; E. W. Hudlow, general safety, and W. R. Stovall, medical division.

Appointment of the committee is an aftermath of the President's budget message to Congress, in which he said: "With the increasing maturity of civil aviation, the Federal Government soon should be able to reduce substantially its safety promotion and enforcement activities without affecting the present high level of safety. I have requested the early preparation of a plan, in cooperation with industry, to achieve this objective." • • •

Air Force to Get First T-37A in December

USAF will begin its 8,000-hour flight evaluation program of the T-37A jet trainer at the end of this year, with Cessna Aircraft Co. scheduled to deliver the first of 11 evaluation planes in December. "Bugs" in the Continental J69 turbojets reportedly may delay production schedules somewhat, but the last of the 11 planes is so far set to be completed in May 1956, with USAF planning for Cessna to go on a six-a-month production schedule in June 1956. Ultimate goal is 17 per month. Photos show detailed cutaway of the twin-jet trainer and new in-flight shot on a test in Wichita. The Army is expected to place an order for 10 of the trainers, although first delivery would not be expected for at least a year.



ACC, Congress Act to Resolve Tacan Dispute

But Squabble May End up at White House

AIR COORDINATING COMMITTEE and Congress have taken new steps to resolve the Tacan/VOR-DME dispute.

ACC has instructed its NAV Panel either to reach unanimous accord on Air Navigation and Development Board's decision in favor of Tacan, or recommend a suitable alternative.

However, with Civil Aeronautics Board and State Department outspokenly against the sudden switch to Tacan, a split decision is expected, with a possibility the dispute may wind up at the White House.

The Panel's industry advisory committee has been promised a minimum of 75% attendance at the sessions, which will be held full-time until a final report is ready—before the April 15 deadline. It has been learned that the CAB representative made it clear that unless the military answered completely and fully specific questions, the Board could not go along with Tacan. State Department previously had expressed displeasure because of international implications.

• **Sen. Styles Bridges (R-N. H.)** got action from the Senate Commerce Committee last week on approval of his resolution to establish a joint House-Senate group to study the issues. A floor vote was expected imminently on approval of the committee and authorization of $125,000 for its administration. The House is expected to consent, following expected Senate approval.

Reliable sources informed AMERICAN AVIATION that part of the investigation of the committee will include possible "interlocking" interests between key military figures responsible for Tacan development and a private corporation.

Meanwhile, Milton W. Arnold, vice president of the Air Transport Association, classed DME as a "luxury" in testimony before the House Interstate and Foreign Commerce Committee. He conceded that VOR/DME is "fully adequate to meet present airline needs" but, following consultants reports and military requirements presentations he concluded that VOR "was not adequate for military use."

"It seemed to me," he stated, "that the civil users had no alternative but to begin to move in the direction of adopting Tacan as the air navigation-traffic control system of the future. This conclusion was required not only because of the need to maintain a common system concept . . . but also because of the conflict between Tacan and civil DME."

Arnold

• **He conceded that Tacan** could be assigned a portion of the frequency band concerned, with DME using another portion, "but it involves an abandonment of the common system concept, and actually would prevent the full implementation of Tacan as the ultimate common system component." If the Government endorses such a system, (i. e., the continued use of DME and limited expansion of Tacan), he pointed out, it will determine that a common system "is a thing of the past."

He agreed that Tacan would require a great financial burden to the airlines, but feels there is no other way out. "I think it is quite evident that the complexities from a weight, maintenance and economic standpoint would require considerable expenditure for maintenance of the extra equipment and probably an $8,000 to $15,000 capital investment per aircraft for the purchase and installation of Tacan," he said.

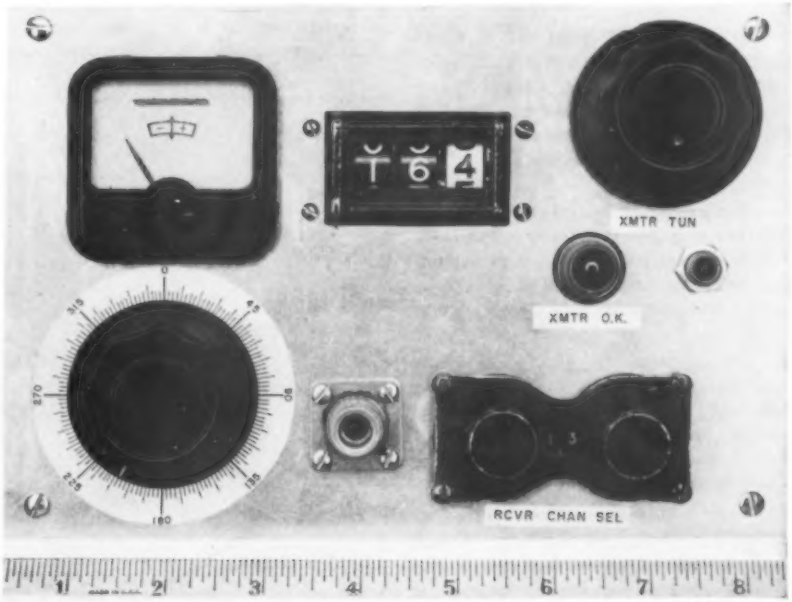
He concluded that if the committee determined that VOR/DME will not meet the stated military requirements, "we would have no choice but to accept the economic and operational burden imposed by the transition to Tacan in the interest of continuing a common system for civil and military users."

• • •

Robert Murray Joins Baldwin-Lima-Hamilton

Robert B. Murray, Jr., who resigned Jan. 20 as Undersecretary of Commerce for Transportation, has been appointed special assistant to the president of Baldwin-Lima-Hamilton Corp., New York.

Murray, a controversial figure during his two years at Commerce, has been assigned to special projects under B-L-H president Marvin W. Smith. The company primarily is manufacturer of locomotives and heavy equipment, but also produces aircraft testing components.



DISPLAY MODEL of civil Tacan airborne unit reportedly proposed by Federal Telecommunications Laboratories, Inc. weighs about 25 pounds—uses a counter type distance indicator.

Russian Aircraft Given New Code Names

The recently disclosed NATO code system for describing Soviet aircraft is based on five letters of the alphabet: B for bombers, C for transports, F for fighters, H for helicopters and M for flying-boats. The following list gives official NATO code names for the various models with details of the names by which they were previously identified in the West as well as designations thought to be used within the Soviet Union.

CODE DESIGNATION		SOVIET DESIGNATION		SPECIAL DESIGNATIONS
NATO Code Name	USAF Type No. (Old System)	Official Mfr.'s Designation	Secret Designation of Plant or Development No.	Designations in the Western Trade Press
Badger	Type 39	?	ZAGI Type 228(?)	Twin-jet bomber seen over Moscow May 1, 1954
Bat	?	Tupolev Tu-2	?	Tupolev Tu-2
Beast	?	Ilyushin Il-10 Stormovik	?	Il-10 Stormovik, sometimes called "Black Death"; older versions Il-2 and Il-3 (BSch or BS)
Bison	Type 37	Tupolev(?) "Molot"	ZAGI Type 428	Soviet Comet, Tupolev X, Tu-16, Tu-37
Bob	?	Ilyushin Il-4	?	Il-4, DB-3F
Bosun	Type 35	Tupolev Tu-7	?	Tu-12C, Tu-35
Buck	?	Petliakov Pe-2	?	Pe-2
Bull	?	Tupolev Tu-4	?	Tu-4, Soviet B-29, Tu-29
Butcher	Type 27	Ilyushin Il-28	?	Formerly: Tu-10, Tu-27, Tu-28, Il-27, Il-26
Cab	?	Lisunov Li-2	?	Soviet DC-3, license version of C-47
Coach	?	Ilyushin Il-12	None	"Coach" also used for the new Il-15 version
Falcon	Type 14 and Type 20	Mikoyan MiG-15	Various	MiG-15, MiG-15A, MiG-15 bis (1948 and 1951 versions), Mi-1
Fang	?	Lavochkin La-11	?	La-11
Feather	Type 16	Yakovlev Yak-17	?	Yak-17. "Feather" may also be used for the Yak-10, Type 26)
Flora	Type 28	Yakovlev Yak-23	?	Yak-23
Frank	?	Yakovlev Yak-9 (various versions including Yak-9P)	?	Yak-9
Fresco	Type 21(?)	Mikoyan MiG-17	?	MiG-17 (this number was earlier used for the MiG-19, the twin-engine MiG-15)
Fritz	?	Lavochkin La-9	?	La-9
Hare	Type 36(?)	Mihail Mil Lar-3	?	Tushino 1953, Mil-36
Mop	?	GST	?	License-built PBY-5 Catalina

Navy Tests Automatic Carrier Landing System

U. S. Navy's program for all-weather operation of carrier-based fighters moved a major step toward reality recently with the disclosure by Bell Aircraft Corp. of successful development of a new automatic carrier landing system.

Bell's ACLS, developed in conjunction with Navy scientists, reportedly will make carrier landings possible under weather conditions that ordinarily would force suspension of combat operations.

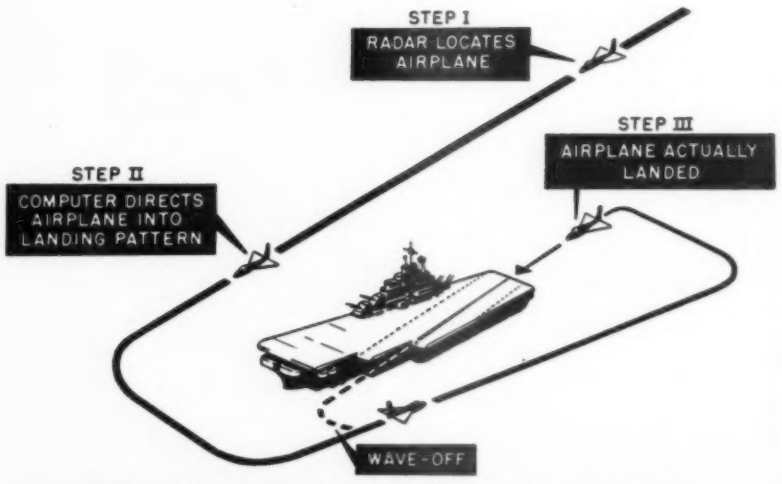
During tests to date at a Navy land facility, several hundred automatic hands-off landings have been demonstrated successfully. Further testing of ACLS in actual carrier operation is slated to take place soon.

Here's how the system works:

• First, the approaching aircraft is located by radar and its position and attitude determined in relation to the carrier deck. Speed and direction are computed automatically.

• This information is then fed into an electronic computer which compares the plane's position with what it should be for a successful landing. The necessary corrections are then computed and relayed to a radio transmitting device which actually directs the aircraft to the carrier deck.

• Carrier speed, position, pitch and roll are all taken into consideration by ACLS. In event the ship attitude is not right for a safe landing, the system automatically diverts the aircraft for a second attempt.



SCHEMATIC shows how Navy's new automatic carrier landing system works.

NBAA Members Approve Reorganization Program

Members of the National Business Aircraft Association have approved a reorganization plan and amendments to the by-laws that make it possible.

Two major changes call for:

• Establishment of an executive council of key executives from various industries using business planes.

• Creation of the offices of president and one or more vice presidents to be elected to represent various sections of the country.

Under the new setup, Henry W. Boggess, aviation director of Sinclair Oil Co., becomes president in lieu of chairman of the board, and Ralph E. Piper, chief pilot of Monsanto Chemical Co., becomes national vice president, instead of vice chairman. The office of executive vice president has been established but no one has yet been named to fill it.

Boggess described the changeover as "the first step in the longrange program designed to decentralize NBAA to insure regional, state and local membership participation, as well as to bring into the organization an advisory group of top level industrial executives for the formation of association policy. NBAA's growth is in keeping with

the rapid growth of industrial aircraft use and the new organizational structure is designed to increase services needed to handle the influx of members."

The executive council will include up to 15 industrial representatives as well as past NBAA presidents. The industry executives to serve on the council will bring a balance to the association by having the aircraft users advising, as well as the actual flying personnel.

AF Drones Get New Remote Control System

U. S. Air Force's jet fighters used on special "drone" missions and as pilotless intercepts are getting a new remote control system that promises a marked extension of their operating flexibility.

A joint development of USAF's Air Research & Development Command and Sperry Gyroscope Co., it combines both radio and radar control to permit automatic takeoffs and landings. Split-second control is also possible throughout drone flight, whether in climb, cruise, orbiting or other maneuvers. In addition, the new system virtually assures recovery in event of control signal cutoff while the drone is airborne, whether due to ground power failure or bomb damage.

Using new UHF radio guidance and command sub-systems, jet pilots at ground stations or in director aircraft will have "tighter" precision signal control over drone operation. If control signals should fail while a drone is airborne, an electronic brain takes over. Within five seconds, it directs the aircraft into a full-power climb of exactly 7°, and automatically retracts dive flaps.

Once a 200-mph speed is reached, a climbing turn to the left is initiated and held until the drone attains a desired altitude. At this point, an automatic altitude control takes over and orbits the jet at 265 mph until signal control is restored.

The new control system is designed to be mass-produced with emphasis throughout its layout on accessibility of parts for ease of maintenance. In the USAF's QF-80 jet drones, compact design of the control system permits retention of the standard Lockheed F-80C cockpit arrangement, particularly the flight safety and emergency controls.

AERONAUTICAL TRAINING SOCIETY presented a scroll to Lt. Gen. Robert W. Harper (ret.) (center) at its annual meeting in Houston for his "brilliant use of the military and civil resources of his country in training manpower for the USAF" while he was commander of the Air Training Command. Making the presentation is Beverly Howard (right) of Hawthorne School of Aeronautics who was reelected president. Looking on is Brig. Gen. William W. Welsh (Ret.) World War II commander of the Southeast Air Training Command and now an executive of Fairchild Engine and Airplane Corp.

BRANTLY HELICOPTER CORP., Philadelphia, is flight testing a prototype two-place copter which it claims has increased economy in operation and maintenance, better cruising speed and characteristics than existing designs. Company is planning to make its headquarters in Frederick, Okla.

Production Notes

Winder Aircraft Corp. of Winder, Ga., will build a new 25,000-sq.-ft. plant in the Southeast to produce electronic navigation equipment. Final building site has not been determined.

Program for modification and conversion of small transport aircraft is under way at **Lamson Aircraft Co.,** Yakima, Wash. First project is a redesign of Ellis Air Lines' Grumman Goose to increase cruise speed 5-10 mph, increase payload and reduce fuel consumption.

Boeing Airplane Co.-Wichita Division has awarded a multi-million-dollar subcontract to **Chance Vought Aircraft, Inc. for** modified B-47 nose sections.

Build-up of the 1,000th Wright R-3350-26 engine for Douglas-El Segundo Division production of A4D Skyraiders has been marked by **Weber Aircraft Corp.** of Burbank, Calif.

Burton Manufacturing Co. has broken ground for a new 37,000-sq.-ft. plant on a 2½-acre site in Santa Monica. Expanded facilities will be used for production of servo motors and precision diaphragms for aircraft, guided missile and industrial uses.

New 20,000-sq.-ft. plant under construction by **Electronic Specialty Co.,** Los Angeles will house completed manufacturing facilities for its Shavex, Contract and Miniature Components Divisions. ESC produces airborne electronic equipment.

New Answers to Survival Problems

By JOSEPH S. MURPHY and WALTER A. KILRAIN

THE DESIGN and construction of aircraft is the province of the engineer. The problem of the men must fly in such machines, withstanding physical and psychological stresses, directing and correcting the planes in flight, and sometimes hurriedly escaping from them, are in the province of aero medicine.

Recently the Aero Medical Association convened in Washington for its 26th annual meeting. Among the highlights of that meeting were:

• **Pilot Aircraft Efficiency**—New high performance aircraft are taxing human capabilities to the hilt. Emphasis on human engineering in the design of improved pilot aids appears to be the only solution.

• **Escape techniques**—Ejection seat mishaps in conventional aircraft and special problems of vertical takeoff designs spurred Navy development of a system of escape at low altitudes.

• **New approaches to accidents**—The importance of making more aircraft accidents survivable was emphasized by both Navy and Air Force; a civilian expert, Dr. Ross A. McFarland, pointed out similarity between accidents and epidemics.

• **Noise**—Solutions to run-up and other ground operation noise problems, as studied at Patuxent NAS, include soundproof helmets, isolation.

• **The Upper Atmosphere**—Hypersonic speeds at 200,000-foot altitudes introduce a new challenge to human survival.

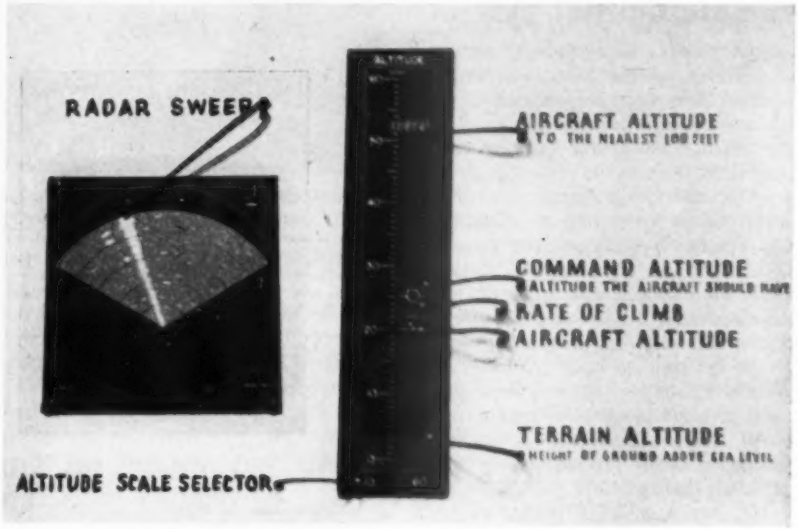
Pilot-Aircraft Efficiency

The rapid evolution of design know-how which has brought into being today's supersonic fighters may be taking its toll in reduced pilot-aircraft efficiency.

Strong indications in a recent rash of accidents involving the latest production models of high performance aircraft point in this direction. They point to human limitations which prevented the pilot from acting with the speed and strength needed to overcome difficulties he might easily have handled in lower performance aircraft.

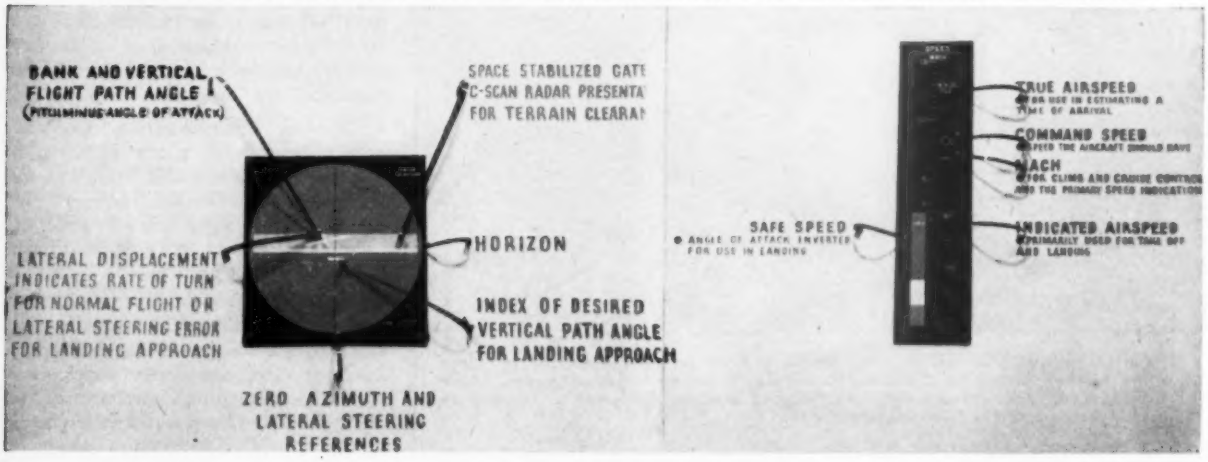
To A. M. Mayo, chief of Douglas Aircraft Co.'s equipment engineering section, this spells the need for emphasis on the design of accommodational aids for the pilot to reduce these accidents. Mayo told the AMA session that such an effort could increase overall pilot-aircraft effectiveness at a higher rate per unit expenditure than some of the more spectacular aerodynamic and mechanical advancements.

In any event, he feels, this emphasis should continue until improved pilot aids bring crew efficiency into approximate balance with that of aircraft performance. These are the major areas requiring attention:



SECTOR PPI RADAR SCOPE AND ALTITUDE INDICATOR

ATTITUDE-STEERING-FLIGHT PATH-TERRAIN CLEARANCE INDICATOR, AND AIRSPEED AND MACH INDICATOR.


BANK AND VERTICAL FLIGHT PATH ANGLE
HORIZON
LATERAL DISPLACEMENT INDICATES RATE OF TURN FOR NORMAL FLIGHT OR LATERAL STEERING ERROR FOR LANDING APPROACH
INDEX OF DESIRED VERTICAL PATH ANGLE FOR LANDING APPROACH
ZERO AZIMUTH AND LATERAL STEERING REFERENCES
TRUE AIRSPEED
COMMAND SPEED
MACH
SAFE SPEED
INDICATED AIRSPEED

• **Personnel Gear**—The pilot is an individual organism and the advantage of integrating all of his equipment to work as an entity is no longer seriously questioned. Results in this direction already have been realized in the design of harness suits, oxygen and anti-blackout equipment.

• **Escape Devices**—Studies into longrange needs for escape equipment have pointed up means of greatly increasing the probability of escape from damaged aircraft. Methods vary from downward escape chutes to upward ejection seats or complete escape capsules. Unfortunately, says Mayo, the more complex the system, the greater the weight penalty.

For this reason it is imperative that the best judgment be used in choosing the correct compromise for a particular aircraft. If not, the application of unnecessary escape equipment can actually reduce overall safety by penalizing the combined pilot-aircraft efficiency.

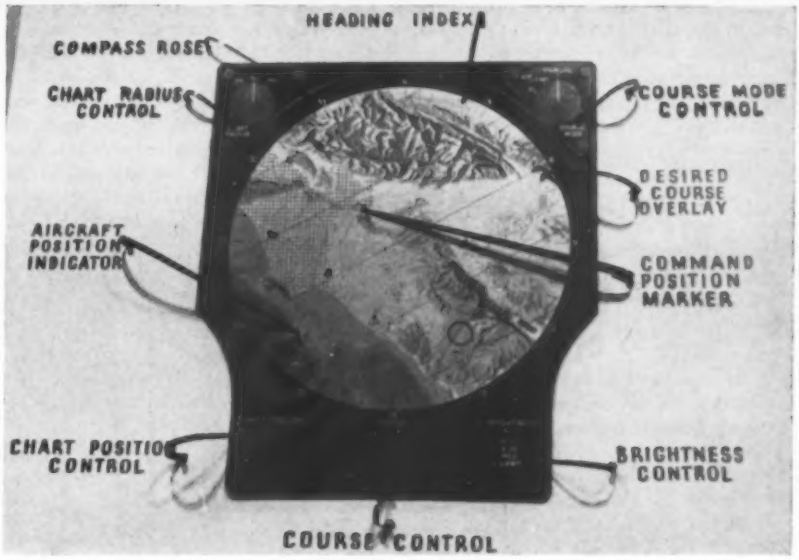
• **Instrument Integration** — The most active area of improved aids for flight crews, the AMA session disclosed, is in improved cockpit instrumentation. According to Mayo, the Navy's longrange instrument project (AMERICAN AVIATION, Jan. 31) has shown that real progress can be achieved only by considering the pilot in relation to the complete man-machine system. It has heavily emphasized the need for a greater available fund of human engineering data to serve the combination best.

Despite all handicaps, however, step by step improvements have been made and a target of 1958 set for a flying breadboard version of new instrument concepts. In the meantime, shortrange phases of the project have made possible some improvement in production aircraft. Other changes, still in a classified nature, will gradually improve the capability of the pilot until the overall objective is reached.

Paralleling the Navy work is the U. S. Air Force-sponsored "cockpit of the future" developed by Hughes Aircraft Co. and exhibited for the first time at the AMA session, It has both civil and military potential and reportedly is now being considered for adoption by the USAF on a specific aircraft type.

The Hughes system is built around these five instruments:

• **Pictorial Computer**—A display of aircraft position on a map-type panel very much similar to past computer models developed for ultimate use in the common civil-military navigation system. It derives heading and distance information from current VOR and DME systems but also can be adapted to operation with the military's Tacan navigation system.



PICTORIAL COMPUTER.

• **PPI Radar Scope**—Presents terrain mapping and weather penetration information and basically serves as an airborne weather radar. It is located immediately above the pictorial computer in the Hughes' cockpit.

• **C-Scan Radar**—Provides the pilot with flight attitudes, steering and terrain clearance data. Situated above the PPI radar scope, it also provides both the lateral and vertical guidance during landing approach now served by localizer and glide path signals.

• **Speed Indicator**—A combination airspeed and Mach indicator, this "thermometer"-type instrument is mounted to the right of the radar scopes. The single indicator provide indicated airspeed for takeoff and landing, Mach indication for climb and cruise control, and true airspeed for estimating time of arrival.

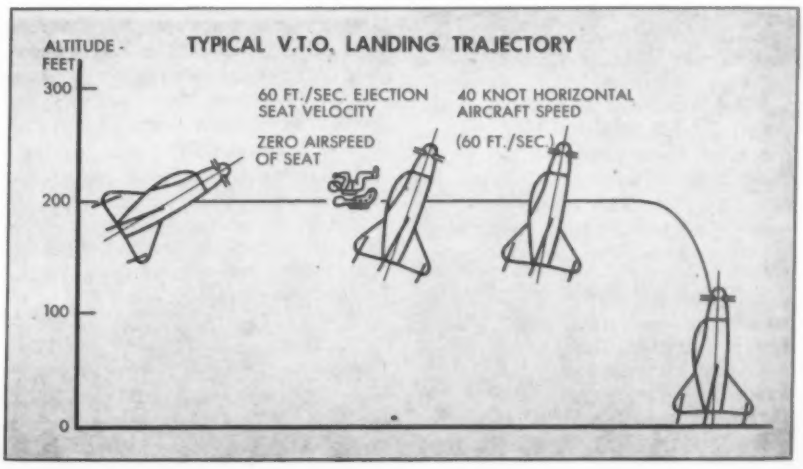
In addition, it offers safe speed indication for landing, and a "command" speed pointer for adaptation to radio link systems in a ground-controlled automatic traffic control operation.

• **Altitude Indicator**—Also a "thermometer"-type display, the Hughes altitude indicator is located to the left of the radar presentation. It provides both a numerical and graphic display of aircraft altitude, depicts terrain altitudes, and also is adapted to "command" signal operation.

As an added feature, the new altimeter presents aircraft rate of climb data on a vertical scale in terms of what the altitude will be in one minute's added time. To determine his rate of climb (normally expressed in feet per minute) the pilot simply has to gauge the distance between the actual aircraft altitude pointer and the pointer showing where he will be one minute later.

The five Hughes' instruments,

ESCAPE FROM A VTO.



which provide much new information not now available to the pilot, will take the place of nine present indicators. Current airspeed and angle of attack instruments are replaced by the new speed indication. Altimeters, rate of climb indicators and radio altimeters give way to the altitude indicator.

Most versatile of the new displays is the C-Scan radar. This multi-purpose device serves to replace current artificial horizons, ILS crosspointer indicators, the Zero Reader, and turn and slip indicators.

VTO Ejection

In ejections from conventional aircraft, the highspeed airflow helps to separate the pilot from his seat and to inflate the parachute. When a vertical takeoff aircraft like Convair's XFY-1 or Lockheed's XFV-1 makes its landing approach at 40 knots, then slowly settles straight down for 20 seconds or more hanging on its propeller, the pilot is in a precarious position in many ways.

If his engine fails, he has no chance of completing the landing by gliding in. If he ejects, the relatively sluggish airstream may not separate him from his seat. A solution to the problem may lie in a radically new ejection system developed by the Navy's Bureau of Aeronautics.

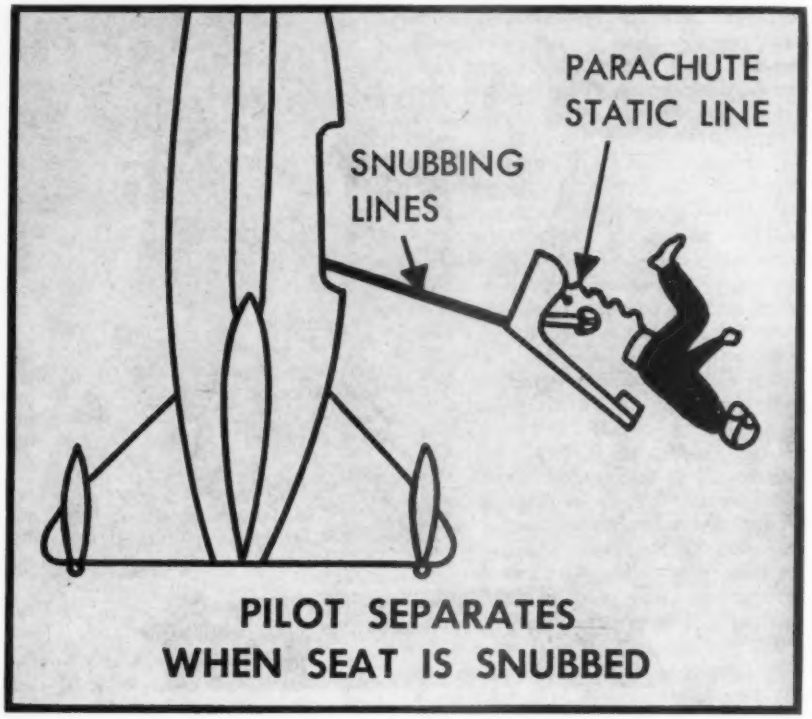
In the BuAer system, the pilot's safety belt automatically opens as the seat is ejected. When seat and pilot have cleared the plane by about six feet, nylon lines attached to the aircraft snub the seat, permitting the pilot's momentum to carry him away from it. A static line running between his parachute and the seat then opens the 'chute. The opening of the 'chute is speeded by strips of fabric called "pocket bands." These are attached around the edge of the parachute canopy on the outside, where the suspension lines join the canopy. Air rushing into these open-pockets tends to pull the canopy open.

With the new system, safe ejections can be made from as low as 25 feet if airspeed is 200 knots or more (see graph). During a normal 40-knot approach, the pilot can eject as low as 200 feet.

At the upper end of the speed range, the static line is disconnected and the pilot waits two or three seconds after ejection before pulling the rip-cord manually. This provides time for his forward velocity to be somewhat reduced, to avoid too great an opening shock.

The system may hold promise for conventional aircraft as well as VTOs. Cmdr. Roland A. Bosee (MSC) USN, who described the system to the convention in a paper co-authored by W. C. Buhler, cited "numerous reports" of difficulty in releasing the safety belt during ejections with present systems. "In a total of 78 ejection seat fatalities," reported Bosee, "41 made contact with the ground with the seat not released."

"It is believed," he concluded, that if [the new] method of seat and pilot separation, or a modification of it, is incorporated into all single-place aircraft equipped with ejection seats, a marked decrease in the incident of aircraft ejection seat fatalities will result."



HOW VTO EJECTOR WORKS.

Accidents

Major aircraft accidents need not result in death. Only one in six of the major accidents in the USAF over the past seven years resulted in fatalities, reported Capt. Richard B. Phillips (MC), USN, and Maj. Charles C. Dugan, (MC) USAF. A long series of case histories drawn from Navy reserve records supported their statistics and their point. Among them:

• **A Douglas DC-3 pilot** making a GCA approach saw what looked like the runway, thanked the GCA operator, suddenly found his right wing slicing through a frame building. The plane spun like a top, but all 11 occupants walked away from the wreck.

• **Another DC-3 pilot** lost an engine while approaching NAS Floyd Bennett in IFR weather. The pilot made one GCA attempt to land, then had to go around. On the second attempt, seagulls on the runway bashed in the nose of the plane. On the third attempt he made it.

• **A McDonnell Banshee (F2H)** pilot tried a slow roll at 12,000 feet over Minnesota, found himself falling through space when his ejection seat dropped out through the canopy while he was upside down. He parachuted safely.

• **Another F2H pilot** had a flame-out over NAS Dallas at 10,000 feet, misjudged the glide ratio, landed three-quarters of the way down the runway, bounced out onto the prairie, jumped a ditch. His plane broke in two, but he limped away from the wreck with only a broken ankle.

The authors' conclusion: "We should direct our concerted effort toward bringing about more protection for the pilot and crew, so that when major flying accidents do occur. . . . 'Happy Landings' . . . . may be the expected termination."

The ways in which such protection may be provided are varied. "Dr. Stapp has shown us," observed the authors in a paper titled "Aircraft Accidents with Happy Landings," "that it is not the force of the acceleration per se which kills our crews."

What does kill is disintegration of the cabin structure, fire, flying missiles, and flying bodies when seats or belts tear loose. Approaches to a solution include stronger structure—in seat anchor-

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Although the number of major accidents per 100,000 hours in the USAF and National Guard has been dropping sharply since 1946 (see table), falling from 61 to 20, the number of fatal accidents per 100,000 hours has not shown a corresponding decrease. By this standard the USAF has lost ground, since a larger proportion of major accidents are now fatal than was the case in 1946. By adopting the measures suggested above, Phillips and Dugan hope that the services may be able to make a larger share of their accidents "Happy Landings."

LATEST INTEGRATED SUIT AND EQUIPMENT.

• **A new view of accident theory** was offered to the meeting by Dr. Ross McFarland, Harvard School of Public Health. McFarland saw a similarity between accidents and epidemics: "The deaths and disabilities that result from accidents are a relatively fixed and recurring health hazard of more or less constant pressure. They correspond in their behavior to the endemic pattern of infection that characterizes so many communicable diseases, and can similarly be deemed to result from the total forces involved in the competition between man and his environment."

"In most accidents," he went on, "there are several causes, and attempts at control should involve consideration of the interaction of host, agent and environment."

The host in McFarland's analogy is the pilot. The agent is the equipment with which he must work (controls, instruments, etc.). The environment includes not only the temperature of the cockpit and the brightness of the sky but also the atmosphere in his home and the Officers Club.

"There is evidence," McFarland declared, "that acclimatization to oxygen want is reduced in emotional states, and upsetting influences in an airman's social environment may thus lower his ceiling for altitude."

By emphasizing the interrelatedness of host, agent and environment, McFarland's "epidemic theory" added weight to the growing number of arguments for more carefully fitting the machine to the man. "It appears," he said, "that unless machinery and working areas are built around the operator, it is hardly fair to attribute so many accidents to human failure."

Fear of Flying

When a military pilot becomes emotionally upset, apparently as a result of his flying experiences, is he showing "fear of flying," with its overtones of cowardice, to be dealt with by punishment? If the same pilot shows physical distress, such as ulcers, instead of psychological symptoms, is he then a medical problem to be cared for with no stigma attached to his case? The squadron commander who thinks that the two situations are basically different, and that he knows just what to do when faced with either type, should think again, Col. Lucio E. Gatto said.

The symptom that puts a man on the sick list may not tell the most significant part of the story, cautioned Gatto, chief of neuropsychiatric service, Sampson AFB, Geneva, N. Y. Each man reacts to stress in his own way, Gatto told the meeting, and the differences between medical and psychological symptoms may be more misleading than informative. Widely different symptoms may spring from very similar causes, which should be investigated before the case is arbitrarily disposed of. At the same time, Gatto addded, when the real cause is discovered, it may turn out to have nothing to do with flying or fear of it.

• **One 26-year-old fighter pilot,** after several combat missions, asked for a physical check-up to eliminate the cause of recurrent airsickness. Thorough examination showed no trouble except a highly sensitive gag reflex. What might have been classed as a "fear of flying" case turned out very differently when psychiatric investigation revealed that the pilot's airsickness was caused by his own feeling that he must excel. This feeling reflected the admiration he had always felt for his father, a highly successful man.

"As he put it," reported Gatto, "'I place him so high, I can only hope to come up close to his level.'" The tension that result from his attempts to be perfect brought on his airsickness. It naturally occurred during those times when he was trying hardest to excel, his combat missions. The fact that his reaction took the form of airsickness also proved to be related to events of his childhood.

"There was no question of a 'fear of flying,'" observed Gatto, "only the question of a fear of living up to the high standards of his own make-up. He returned to his squadron [following psychiatric treatment] where only

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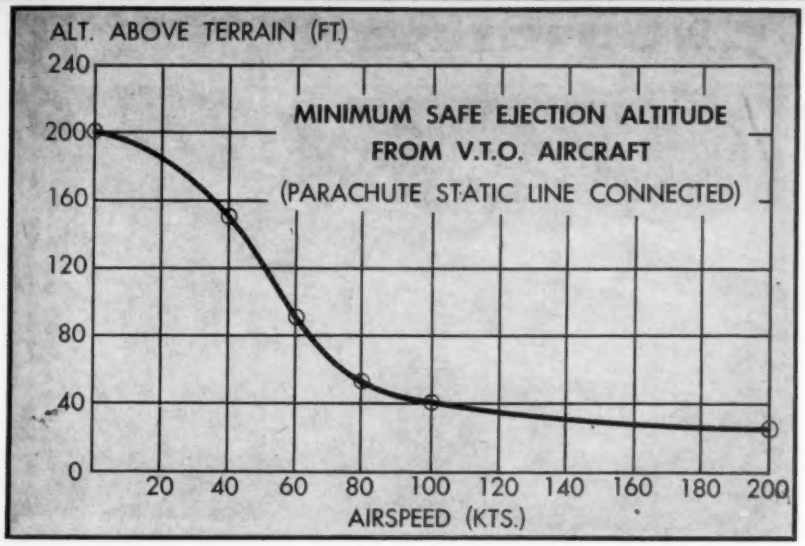

on rare occasions did he have any further difficulty with even slight airsickness."

• **Close analysis of such cases** not only may spare the innocent, it also can reveal those who could properly become the subjects of administrative action, Gatto declared. "A poorly motivated individual, who can hide behind physical symptoms . . . may be absolved from blame," he noted.

A case in point was a veteran of World War II, who had voluntarily returned to active duty because of the money involved. He had no particular interest in any flying assignments except instructing in small aircraft. When he found himself overseas instead, and heard further that he was in for an indefinite time instead of a limited period, he developed ulcer symptoms. He was medically grounded, but no real signs of an ulcer were discovered. Nevertheless, he failed to improve. Psychiatric investigation revealed his lack of interest in his assignment and a marked feeling or resentment against the USAF. "While his case was being evaluated," said Gatto, "he received the decision [he had requested earlier] concerning his status in the Air Force, which was that he could be discharged immediately. With this knowledge, his medical symptoms rapidly cleared, and he returned home for separation."

Both types of cases, if improperly handled, represent an inefficient use of valuable manpower. "The isolated problem of 'fear of flying,'" concluded Gatto, "is really only a minor part of the total problem of all the emotional forces in military aviation that have deleterious influences upon flying personnel. We are still in the early throes of investigation which, while it is arduous and full of painful labor, will eventually reward the investment of constant effort with real progress."

Noise

Noise may be more than a nuisance, acknowledged the Navy. Reporting on noise levels studied in and near the hangars at Patuxent Naval Air Test Center while a J34-WE-42 with afterburner was running, Cmdr. Kenneth S. Scott (MC) admitted flatly: "Noise levels noted here . . . are intolerable. Here it can be seen that conversation is impossible, that work of a technical nature cannot be performed, and that even mechanical work in the bays of the hangars will be very seriously disturbed and in certain cases disrupted completely."

"If mechanical errors are made," he went on, "or parts are left out, including safety wiring or cotter keys, a serious or fatal accident may ensue with the aircraft in flight."

Ear plugs, helmets, and portable mufflers may help, Scott reported. Another answer now under consideration at Patuxent is to remove as much jet noise as possible from areas where men are working. In the center of a triangle formed by Patuxent's three main runways, a partially underground service center would carry out routine maintenance, refueling and engine run-up before takeoff. Jet aircraft would be towed from the hangars to the maintenance center, where gasoline, jet fuel, oil, oxygen and other supplies would be available.

• **The use of Patuxent** as an all-weather base may make the plan impractical there, since a plane touching down just off one of the encircling runways might run into other aircraft parked at the servicing center. For other airports, however, it may prove to be the answer.

Whether the isolated center is the answer or not, some answer must be found, declared Scott. "Some of the sound levels of which I have spoken are still quite high compared with those occurring on most present military jet bases," he said, "but in the near future these levels and even higher levels can certainly be expected and must be anticipated if planning is to meet future needs."

How USAF Accident Rates Have Been Cut

United States Air Force/National Guard

Flying Aircraft Accidents

(Rates are per 100,000 flying hours)

Year	Flying Hours (100,000)	Major Accidents Number	Major Accidents Rate	Fatal Accidents Number	Fatal Accidents Rate	Non-Fatal Accidents Number	Non-Fatal Accidents Rate	Minor Accidents Number	Fatal to Non Fatal Accidents Per Cent	Fatalities Number	Fatalities Rate	All Accidents Number	All Accidents Rate	Aircraft Destroyed Rate	Dollar Loss per $1,000,000
1946 ...	36.2	2194	61	274	8	1920	53	822	13.1	879	24	2326	57	16	....
1947 ...	35.2	1555	44	205	6	1350	38	616	13.6	584	17	2171	63	15	....
1948 ...	44.4	1783	40	243	5	1540	35	671	12.5	619	14	2454	57	13	....
1949 ...	47.0	1731	37	245	5	1486	32	836	13.5	577	12	2567	55	12	98.96
1950 ...	47.8	1744	36	266	6	1478	30	706	16.7	781	16	2457	51	14	137.85
1951 ...	66.6	2184	33	370	6	1814	27	1262	18.2	1015	15	3446	51	12	207.38
1952 ...	79.7	2274	29	399	5	1871	24	1348	17.2	1214	15	3622	45	10	241.73
1953 ...	84.9	2076	24	433	5	1643	19	1253	20.8	949	11	3320	39	11	301.60
1954 ...	91.6	1872	20	376	4	1496	16	633	20.0	796	9	2805*	27*	9	316.36

SOURCE: USAF Flying Accident Bulletins, Directorate of Flight Safety Research.

** Requires 50 hrs. up to 150 hrs. repair depending on type aircraft since 1 July 1954.*

The Comet Crashes

The engineering inquiry into the crashes of de Havilland Comet jetliners at Naples and Elba was paralleled by a medical study conducted by the Royal Air Force Institute of Aviation Medicine. The methods and the results of that study were outlined for the AMA by Air Commodore T. C. Macdonald, AFC, RAF, Director of Hygiene and Research for Britain's Air Ministry. Among the conclusions of that investigation:

• **All but five of the bodies** showed fractures of the skull and ribs, presumably from striking the cabin ceiling, but scarcity of facial injuries or other ante-mortem lacerations indicated that the bodies did not tumble about inside the fuselage after the first instant of explosive decompression.

• **Lack of signs of drowning or fire** indicated that the victims were dead by the time they hit the water, and that the aircraft was not on fire when the accident occurred.

• **All but one of the bodies** in the Elba crash were burned in clothed areas, although clothes and hair were not burned. It was determined, through a painstaking series of deductions and experiments, that the burns or scalds were produced when the bodies floated on the surface of the sea in water heated by patches of burning kerosene nearby.

• **Several bodies in the Naples** accident showed pigmentation of exposed skin. This, the RAF discovered, was produced by ultraviolet light from the sun as the victims floated after death, some for as long as 22 hours.

The Upper Atmosphere

The hypersonic aircraft that will be rocket-boosted to altitudes of 200,000 feet and fly as a rocket glider to its destination poses a new family of problems in human survival.

As Dr. Walter R. Dornberger, guided missile consultant at Bell Aircraft Corp. sees it, they fall into these categories:

• **Pressurization Respiration**—To exist, man must be supplied with sufficient pressure to permit transfer of oxygen to the blood within the lungs. A 3.7 psi partial oxygen pressure will be adequate to bring the pilot to the equivalent of sea level. However, an added pressure increment preferably of some inert gas, will be desirable to create an environment as near to normal as possible.

Two pressurization problems exist. If flight extends beyond more than a few minutes duration, pressure suits of the current variety will be unsatisfactory. Then, the rate of decompression in a rocket-boosted ascent may be too rapid for the pressure decrease, and may have to be controlled.

To answer the needs of pressurization and respiration best, Dornberger foresees use of a form of "stored atmosphere."

• **Refrigeration**—While the means of coping with high outside skin temperatures still requires much investigation, boiling water may be the answer to cooling the hypersonic aircraft. Its boiling point at these altitudes is below the temperature required for human survival and it has a high heat of vaporization. These, combined with the probability that a "stored atmosphere" would be at a low temperature when expanded to cabin pressure, promise to make the cabin temperature problem one of easy solution.

• **Acceleration**—Although it would appear that hypersonic speeds would imply accelerations well beyond human endurance, actually they must be limited to tolerable levels for other reasons. Structural penalties in design to meet large g-loads, for one, reduces the problem. The possibility of intolerable accelerations due to rocket boost presents no problem, as the type of performance desired can be realized economically using low-boost accelerations well within human tolerances.

• **Comfortization**—To solve each of these problems individually is not the whole answer. Although each one may be maintained within human tolerances, the overall combination of unusual conditions presents a combined stress that could well reduce pilot efficiency.

The best approach, says Dornberger, is to bring each environment as near to normal as possible. Where this can't be done, human capabilities should be tested under simulated conditions and the equipment then designed so that the human functions required will not exceed these requirements. • • •

About Aviation's People

A new American Aviation publication, "Who's Who in World Aviation," is just off the press. It gives biographical sketches of 2400 aviation people and represents the first attempt in several years to compile and publish such information in one volume.

Copies of the 345-page bound volume are available at $10.00 each from American Aviation Publications, Inc., 1025 Vermont Ave., N. W., Washington 5, D. C.

People

Manufacturing

E. M. (Ned) Benham, formerly manager of public relations for the Sikorsky Div., United Aircraft Corp., has been named to a similar position with the Pratt & Whitney Div., succeeding **Kenneth Koyen,** resigned. **William Kilpatrick** succeeds Benham at Sikorsky.

O. A. Pfaff, president and gen. mgr. of American Wheelabrator & Equipment Corp., elected to the board of Bell Aircraft Corp.

Edward W. Barrett and **Richard W. Darrow,** elected executive v.p.s of Hill and Knowlton, Inc.

Clarence Felix, v.p. and gen. mgr. of Crosley Government Products Div., named a v.p. of Avco Manufacturing Corp., the parent company.

Roy L. Blanchard, formerly v.p.-operations, elected president and gen. mgr. of Beaver Precision Products, Inc.

Guy W. Shafer, appointed gen. mgr. of General Electric's Small Aircraft Engine Dept., Lynn, Mass. **Herbert L. Ross** is the new manager of the department's Everett, Mass., plant.

Jack W. Gailey, named gen. mgr. of Dallas Avienics, succeeding **W. D. Price,** resigned.

de Hoffman

Gailey

Raymond C. Blaylock, chief engineer of Chance Vought Aircraft, given responsibility for all engineering operations following resignation of **Fred N. Dickerman,** director of engineering.

A. M. Davis, formerly chief production engineer of A. V. Roe Canada, named chief of engineering and manufacturing services of Marquardt Aircraft Co.

Harvey L. Hansberry, former chief of the Power Plant Branch of CAA's Technical Development and Evaluation Center, Indianapolis, appointed chief engineer of the Fireye Div., Electronics Corporation of America.

Trevor Clark, formerly associate director of Southwest Research Institute, named asst. to the engineering mgr., Westinghouse Electric Corp.'s Air Arm Div.

Roy H. Olson, promoted to dir. of engineering in the communications and electronics div. of Motorola, Inc.

Dr. Frederic de Hoffman, connected with the Los Alamos Scientific Laboratory since 1944, joins Convair Div., General Dynamics Corp. as asst. v.p. for nuclear planning. Convair also engaged as consultants the following scientists for the military aircraft and missiles systems program: **Dr. Theodore von Karman, Dr. Richard Courant, Dr. Peter D. Lax,** and **Dr. Milton S. Plesset,**

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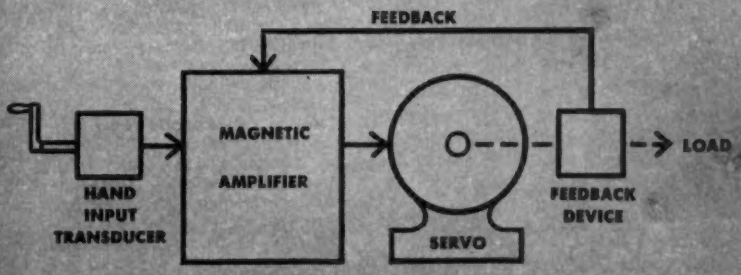

The task called for a rugged, reliable drive of a motor which would deliver up to four horsepower on acceleration, and at least 1½ horsepower continuously. Maintenance requirements to be at a minimum. The drive must be able to stand high shock and operate under several G's. It must operate in temperatures from –65° to 165°F.

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in the field of mathematics and aerodynamics; **Dr. Hans Bethe, Dr. Kenneth M. Case; Dr. Charles L. Critchfield, Dr. Mark M. Mills, Dr. Edward Teller,** and **Dr. John A. Wheeler,** in theoretical physics; **Dr. Robert F. Mehl, Dr. Frederick Seitz,** metallurgy and theory of metals; **Dr. Lan Jen Chu,** experimental physics and electronics; and **Dr. Fred L. Whipple,** astrophysics.

Vice Adm. John B. Moss (USN, Ret.), elected president of Hoffman Laboratories, Inc., subsidiary of Hoffman Electronics.

George S. Dart, formerly eastern mgr. and a v.p. of Pacific Air Freight, named domestic sales mgr. of Air Express International Corp.

Earl D. Johnson, senior v.p.-development and operations, elected a member of the board of General Dynamics Corp. He was also named vice chairman of the board's management committee.

Robert H. Wood, former editor of *Aviation Week,* named asst. to the president of McDonnell Aircraft Corp., in charge of public relations and advertising.

Eugene Easterly, named v.p.-distribution, and **E. G. Hickling,** named v.p.-operations, of Linde Air Products Co., Division of Union Carbide and Carbon Corp.

L. R. Ripley, president of Heli-Coil Corp., elected to the board of Doman Helicopters, Inc.

K. A. Hovington, named sales mgr. and mgr. of contracts and administration of Cossor (Canada) Ltd.

Airlines

Stanley C. Kennedy, Sr., president and a founder of Hawaiian Airlines, planning to retire in July. Company expects him to become board chairman, a position still to be created. **Arthur Dee Lewis,** exec. v.p., will become president.

Gordon M. Bain, former director of the bureau of air operations of the Civil Aeronautics Board, named exec. v.p. of Slick Airways. Slick also has three new directors: **Maj. Gen. Fred S. Borum (USAF, Ret.),** v.p.-Liberty National Bank of Oklahoma City; **John B. Alison,** v.p., Northrop Aircraft, Inc. and **John S. Graham,** a consultant and former Assistant Secretary of the Treasury.

H. Max Healey, formerly commercial v.p. of Colombia National Airways (Aviianca), appointed resident v.p. for the U. S. **Herbert Wild** moves up from gen. traffic mgr. to v.p.-traffic and sales. **Juan Ucros,** U.S. general representative since 1950, promoted to traffic and sales mgr. of the international div. located in Bogota.

H. Laird Loftis, named d.s.m. in New York for British Overseas Airways Corp. **Henry J. Wadge** succeeds Loftis as U.S. interline officer. **Wilfred Greenway,** named U.S. cargo sales officer replacing Robert Ritchie, retired.

John F. Davidson, formerly v.p., operations of California Eastern Airways, appointed asst. to the president of Pacific Airmotive Corp. Also at PAC, **L. B. Littrel,** named v.p. of aircraft service from mgr., Burbank Aircraft Div.; **Parke W. Moewe,** former corporation counsel for The Flying Tiger Line, appointed general counsel; and **Lloyd R. Earl,** president of United Concrete Pipe Corp., elected to the board of directors.

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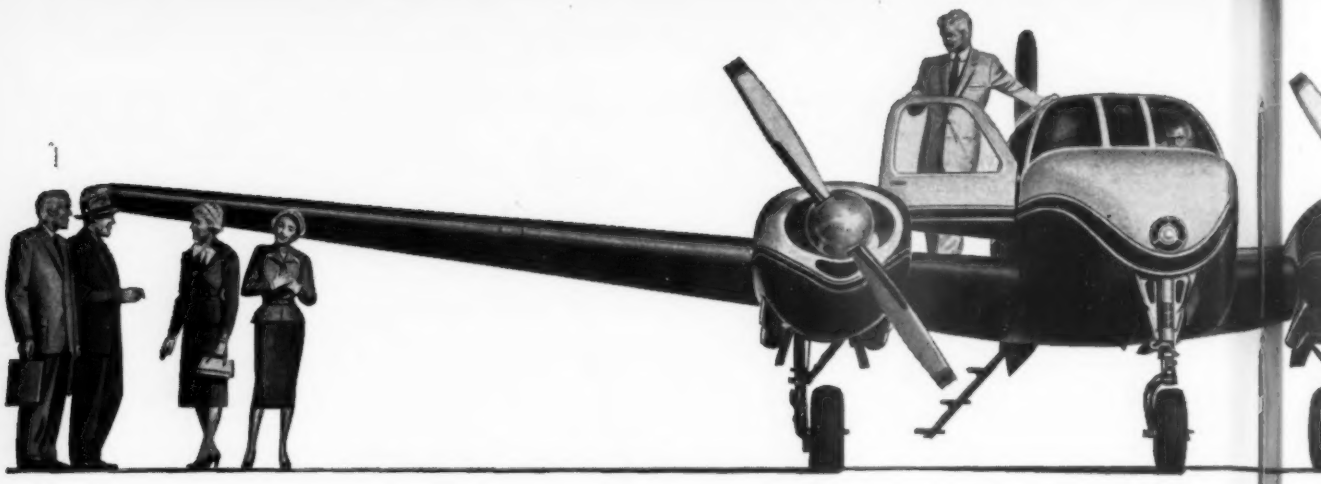

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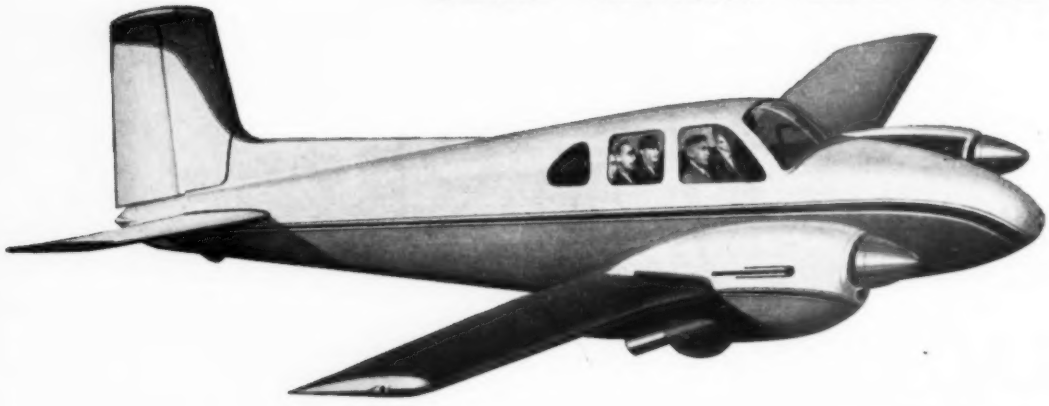

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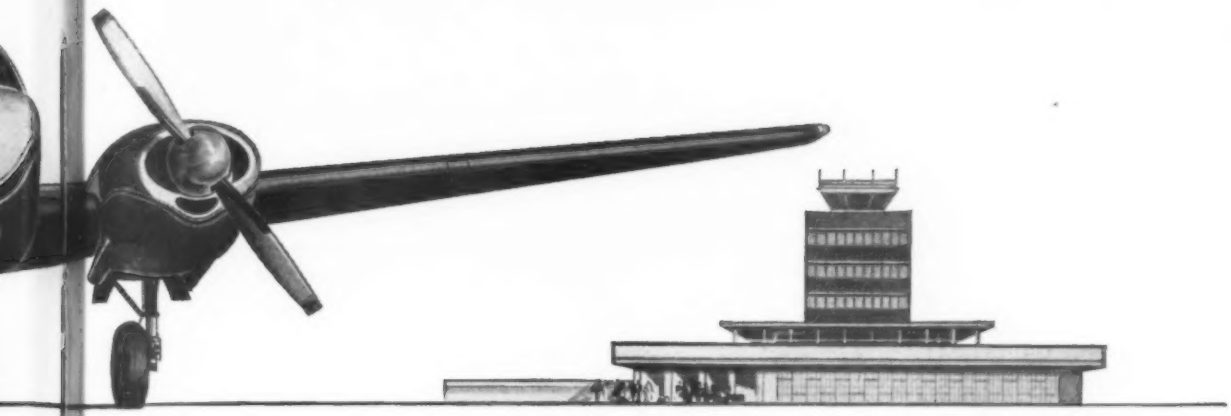

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Lowell Lee, PAA. Assistant to the d.s.m., Miami.

Wilson T. Jarboe, Jr., PAA. Adm. asst.-communications, New York.

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***George E. Steiner,** Scintilla Div., Bendix. Gen. mgr., Sydney, N. Y. 30 years.

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Sedgwick Welch, Pratt & Whitney. Heat treater, East Hartford.

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Reginald T. Putman, Pratt & Whitney. Gen. supvr.-materials development lab. chemistry section, East Hartford.

Walter Zepke, Pratt & Whitney. Engineering field rep., Philadelphia.

Abdulla Agish, Sikorsky Aircraft Div., United Aircraft Corp. Paint shop, Bridgeport.

H. L. Garrison, UAL. Supt.-ground opns., Denver.

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West Coast Talk . . . By Fred S. Hunter

WE WOULDN'T SAY that entering a military aircraft competition has quite the same element of risk as a high-rolling crap game at Las Vegas, but it's certainly getting to be an expensive pastime. A few years ago, about 1947, an aircraft manufacturer could put together a design proposal for about $40,000.

Today, it costs $250,000 to throw in a chip. If you are really after a big pot, it may cost considerably more. Lockheed, for example, has invested more than $500,000 in a new Navy patrol design submitted to the Navy for a follow-on to the P2V series. The same manufacturer spent $500,000 in preparing its jet tanker bid. On this large-scale gamble, Lockheed won a Phase I contract, which in itself will be wholly profitless, but may lead to opportunity later on.

Douglas spent even more and came out with a blank. There always has to be a loser, either in a crap game or an aircraft competition. What makes it so much more expensive to bid these days? One reason is the tremendous amount of wind-tunnel testing that has to be done to figure out the 1955 variety of aircraft.

• •

WE DON'T KNOW of a better show than watching a sharp jet pilot in a chase plane make a split-second pickup of a takeoff of another jet. We had a grandstand seat for one of these brief breathless moments on the rooftop of Convair's seven-story office building in San Diego the other day. A Convair test pilot, Rex Warden, took off with unfaltering precision on the first flight of a new F-102A. Capt. Don Butterfield of the Air Force plant representative's office flew the T-33 chase plane. His timing was letter perfect as he arced across the field. It was all "just routine," of course. But it was a thrilling sight nonetheless.

• •

LOS ANGELES AIRWAYS is now operating 84 trips a day in and out of Los Angeles International Airport, which makes it the busiest operator on the field, measured in terms of aircraft taking off and landing . . . When TWA Capt. Bob Mueller took a look out the cockpit window the first time up in the tip-tank-equipped Model 1049G Super Constellation, he says he thought for a moment he was being intercepted . . . Wright Aeronautical's price on the new EA engine, which goes in the Douglas DC-7C and the Lockheed Model 1649 Super Constellation, will be $79,800, which means airlines will pay $3,600 for the additional 150 hp, considered cheap at the price.

• •

MANY PEOPLE out this way think Arthur Raymond's promotion of Carlos Wood to chief engineer at Long Beach will turn out to be a master stroke. They say he not only will effectively "put out the fire" on the B-66 but also gradually will build up Air Force acceptance of Long Beach engineering to a level comparable to El Segundo with the Navy and Santa Monica with the airlines. Wood is a salesman as well as a talented engineer.

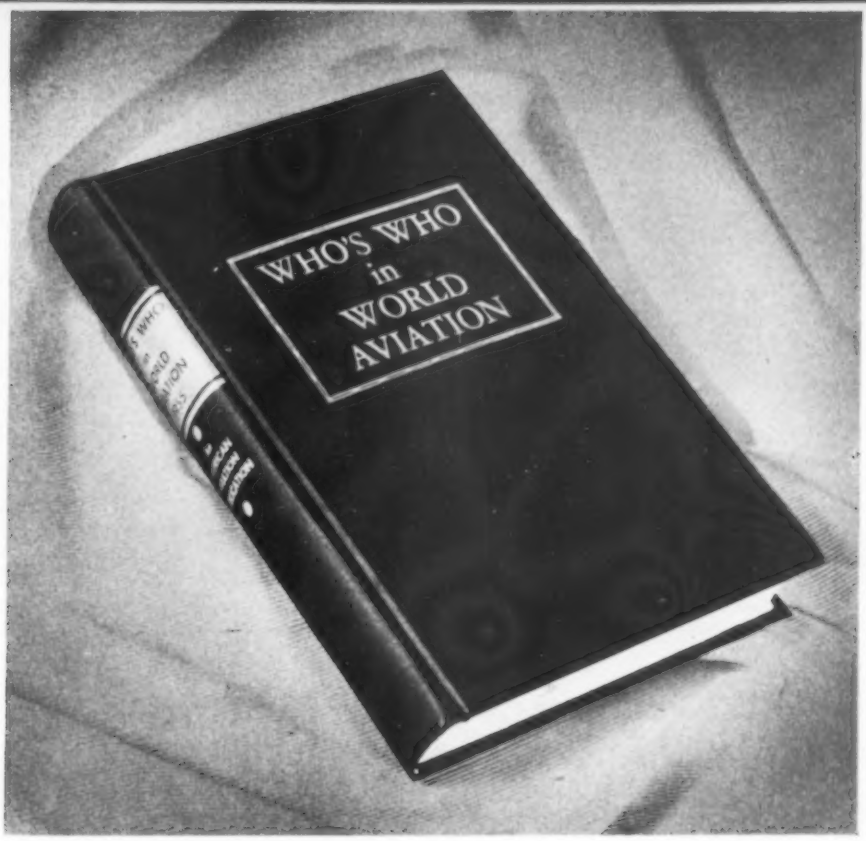
At the same time, John Buckwalter who returns to Santa Monica as assistant to Raymond, is one of the best liked men in the business and is regarded as an ideal selection for a supervisory post in the overall corporate organization. Good move all around.

• •

SEEMS TO BE NO END of how complicated things can get. Now aircraft repair crews are calling for weather forecasts. This happened a while back when a Boeing B-52 washed out its gear in landing at the Air Force Flight Test Center at Edwards AFB after the flight from Seattle. It gets a little windy up at Edwards, and the boys had to get a forecast on a suitable time to jack-up the hugh craft and haul it off the runway.

• •

EASTERN AIR LINES' DC-7s are really going to have a Cadillac look. Interiors, it develops, are designed by Harley Earl, who is General Motors' vice president of styling and an old friend of Capt. Eddie Rickenbacker.



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A4D NEARS COMPLETION at end of line. Shown are N. E. Heath, asst. supt. of A4D project (foreground), and W. W. Hill, general foreman of final assembly.

A4D Production—Design For Efficiency

THE "keep it simple" philosophy of E. H. Heinemann, chief engineer of Douglas Aircraft Co.-El Segundo, in the design of the lightweight Navy A4D attack bomber, doesn't stop with the aircraft. A4D production has been simplified, too.

First published photos of the new $1.5-million three-unit plant, built solely for the A4D, show a modernized two-level production line. Parallel assembly bays are 440 feet long and 120 feet wide with offices in between.

The two-level lines are designed to minimize bending and stooping, thus reducing worker fatigue and increasing manhour efficiency.

A4D construction is in three sections—wing, forward fuselage and aft fuselage. Tail attachment and Wright J65 engine installation take place on the operational line.

Each section is completely equipped with electrical, hydraulic and cable installations. All mechanical operational checks, including Douglas and final Navy inspections, are conducted before each section is moved to the final line.

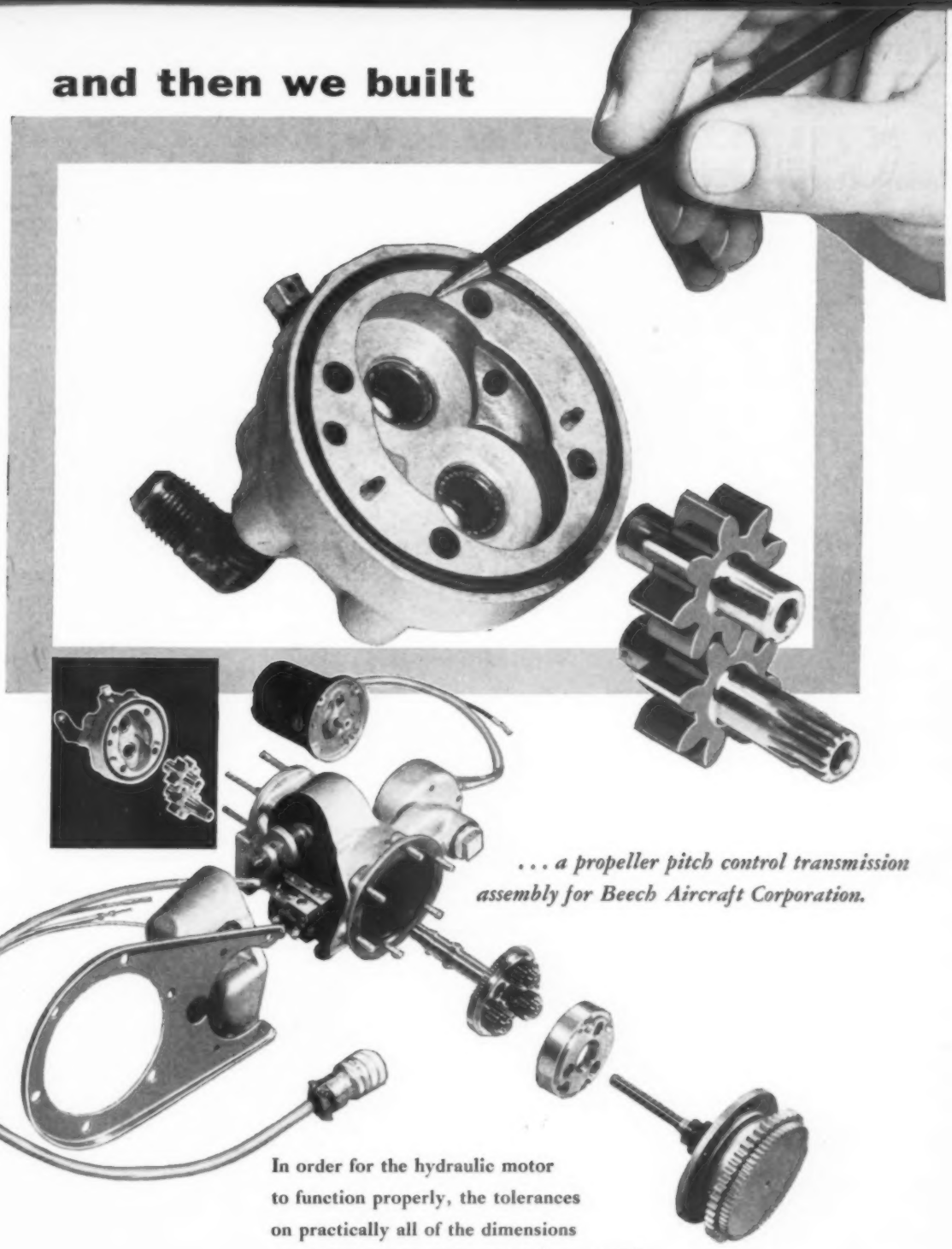
In final assembly, A4D fuselage is attached to the wing by bolts on each side. A single plug provides electrical connection between the fore and aft fuselage sections, and the hydraulic system employs quick disconnects. Building No. 1 at El Segundo is for final assembly. Wing components are installed in Building No. 2, and basic wing structure is assembled in Building No. 3.

• • •

FUSELAGE sub-assemblies roll in pairs down two-level line. Interior packages are installed at each advanced station before receiving area is buttoned up.

DOUBLE-DECKED wing assembly line (top only shown) cuts worker fatigue, increasing efficiency. Landing gear is installed here before fuselage mating.

and then we built



. . . a propeller pitch control transmission assembly for Beech Aircraft Corporation.

In order for the hydraulic motor to function properly, the tolerances on practically all of the dimensions had to be held to within .0001″ or .0002″ for squareness, parallelism and concentricity.

INDIANA GEAR

INDIANA GEAR WORKS, INC. • INDIANAPOLIS, INDIANA

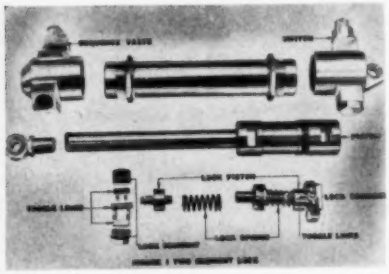
Circle No. 22 on Reader Service Card.

New Products and Processes

Boeing Develops Self-Locking Actuator

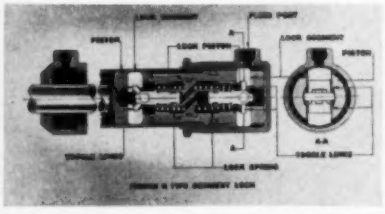
A new internal locking actuator developed by Boeing Airplane Co. could revolutionize future design of aircraft landing gear, gear door and bomb-bay installations. Called Toggle-Lock, it eliminates the need for complex external linkages and locks on these mechanisms and substitutes a hydraulically-operated mechanical lock within the actuator itself.

The device is seeing first service on Boeing's 707 prototype jet transport. Production will be handled by Phillips Control Corp. under license arrangement with Boeing.



Emphasis in the new design is on simplicity and weight saving. Success achieved by Boeing was borne out during evaluation when a Toggle-Lock tested in the B-52 wingtip gear rig met all requirements while permitting a 140-pound weight saving and a reduction from 156 to 59 in machined parts.

So far, Boeing has designed Toggle-Locks ranging in diameter from 2⅛" to 3½". The smallest diameter actuator that could use the principle is 1½", but there is no top limit. Boeing engineers estimate a 5" dia. unit would handle a 500,000-pound load. Two locking arrangements are possible, one with two lock segments and another with four. The two-segment type would unlock under the highest load that could be imposed hydraulically. The type using four segments has a static load-carrying ability about equal to the maximum column load that can be built into the actuator.



Here's how it works. To unlock, hydraulic pressure acts on a lock piston (see cutaway), moving it toward the rod end. Toggle links attached to the piston are forced off center. At the same time, pressure acting on the main piston extends it and forces the segments to retract into the piston and unlock the actuator.

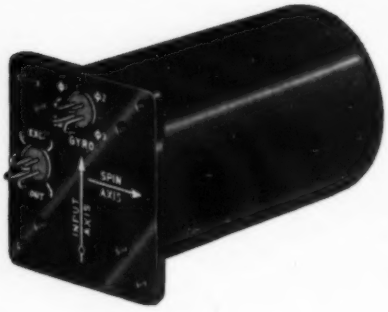
As the main piston extends, the segments are held in unlocked position by the barrel. Once fully extended, the lock spring and hydraulic pressure act on the lock piston in the other end of the main piston, forcing the toggles on center. The locking segments then extend to engage the rod end gland and lock the actuator in extended position.

Circle No. 50 on Reader Service Card

Rate Gyro

A new low-cost damped rate gyro introduced by R. C. Allen Business Machines, Inc. weighs only 0.8 pound and measures 1¾" dia. It is in production for control system, autopilot and guided missile applications.

Power required by the Allen gyro is 26- or 115-volt, 400-cycle a-c either 2- or 3-phase. It develops an angular



momentum of 400,000 gr. cm² per second and can be damped from .2 critical to over-damped through a temperature range of —55°C to 80°C without a heater.

Circle No. 40 on Reader Service Card

Hydraulic Hose

Prototype development of a new high pressure hose that will operate in 3000 psi aircraft hydraulic systems at temperatures of more than 400° F has been announced by Resistoflex Corp.

Known as Fluoroflex-T YR700, the new hose is said to be 100% inert to chemical action, and to withstand all known synthetic or petroleum-based hydraulic fluids. Sizes now available for field testing are ⅜" and ½" dia.; ¼", ⅝" and ¾" hose is being developed.

Circle No. 41 on Reader Service Card

Counter Altimeter

Solution of the long-standing problem of pilot confusion of altimeter readings may result from recent development work by Kollsman Instrument Corp. The company has announced that friction problems associated with its original counter type altimeter six years ago have been overcome. It is now producing 500 instruments for the Navy and Douglas Aircraft Co. and first deliveries already have been made.

The Kollsman altimeter gives the pilot a direct indication of altitude in thousands of feet on a two-digit counter. A single pointer makes one revolution per 1,000 feet and indicates increments of altitudes less than 1,000 on a scale graduated at 50-foot intervals. For example, at 11,000 feet the pilot would see the number 11 on the counter and the dial pointer would be at zero.

The instrument is temperature-compensated to guarantee accurate readings within the range of —60°F to 160°F. A new method of balancing the acceleration force also protects against loss of accuracy due to high G-loads during jet maneuvers.

Circle No. 42 on Reader Service Card

Airborne Hoist

New hand-operated airborne-type hoist developed by Western Gear is rated for a top operating load of 1,000 pounds. It can be driven by a standard ⅜" hex socket speed wrench.

The hoist has a reeling capacity of

22 feet of 3/32" cable, and uses a ratio of five turns of the input to one drum revolution. It allows a maximum pull-

off angle of 12° and weighs 4.75 pounds.

Circle No. 46 on Reader Service Card.

Laminated Plastics

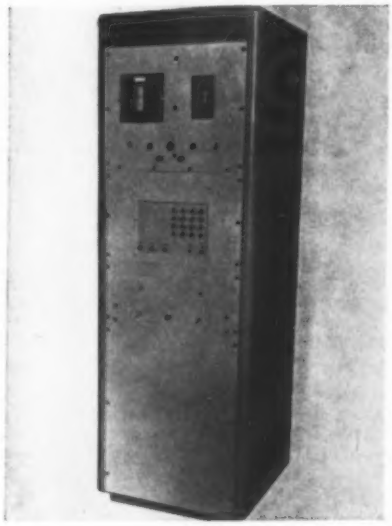
New thermosetting laminated plastics marketed by Synthane Corp. use a diallyl-phthylate base to combat moisture. They are specially designed for military electronic devices and no precision instruments used in damp, humid climates.

Three types include an impregnated canvas Grade C-104, Orlon Grade 0-104 and woven glass cloth Grade G-104. Operating temperatures by grade: canvas, 275°F; Orlon, 225°F, and glass fabric, 325°F.

Circle No. 44 on Reader Service Card

Pressure Measurement

Time-consuming manual logging of pressure data is eliminated in a newly developed multiple pressure readout system announced by Fischer & Porter Co. It permits measurement of up to 200 pressures simultaneously and reads out digital values accurate to one part



in 2,000, all within two minutes of actual pressure sensing.

The system consists of a number of pressure comparators each of which receives one of the pressures being sensed. A pressure "sweep" combined with an electrical memory system serves to retain pressure data for a readout cycle that delivers the data to an automatic logger readout device.

Circle No. 43 on Reader Service Card

Vertical Gyro

Lear, Inc. Grand Rapids Division has developed a new vertical gyro which uses all steel components to produce a predictable free drift rate that is uniform throughout its operating temperature range.

Use of steel parts, Lear says, overcomes the problem of differential expansion among different materials which caused variations in free drift with changes in operating temperature. As

TO THE FINE ENGINEERING MIND
SEEKING THE CHALLENGING PROJECTS IN

HYDRAULICS AND CONTROLS

HYDRAULICS AND CONTROLS ENGINEERS are urgently needed and offered exceptional opportunities now at Convair in San Diego, California. *Hydraulics Engineers* for analysis and selection of components, test stand operation and coordination, and training of field service personnel. *Hydraulic Servo Engineers* for system planning and analysis in relation to hydraulic operation of servo control systems. *Pneumatics Engineers* for design and selection of high pressure pneumatic actuators, weight reduction surveys on problems of hydraulics vs. pneumatics, and thermodynamic and fluid dynamic analysis of systems. *Controls Engineers* for layout and design of control system for high performance aircraft; coordination of powered flight controls with servo mechanism and hydraulic systems; automatic flight controls, including pilot assist, pitch and yaw damper; and other sub-systems analysis and design.

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H. T. Brooks, Engineering Personnel, Dept. 204

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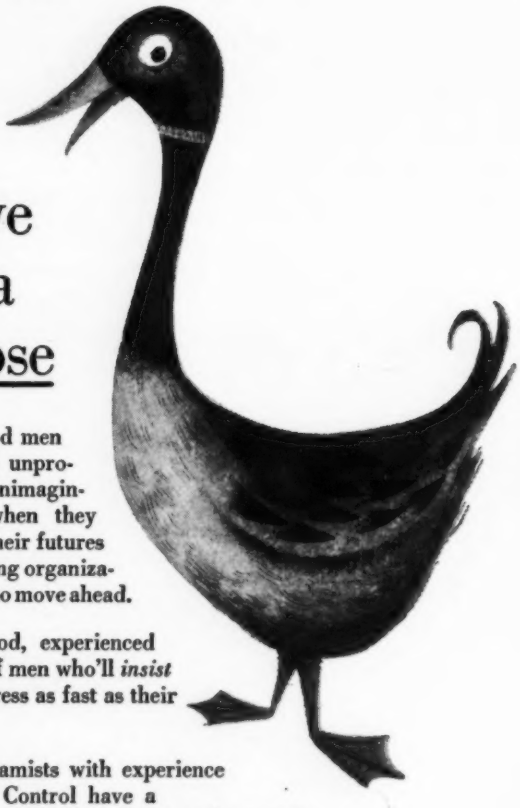
Sometimes, when you're looking for golden eggs...



You have to find a new goose

Sometimes very good men waste their time in unproductive jobs with unimaginative companies, when they should be building their futures with a forward-looking organization that *wants* them to move ahead.

Fairchild wants good, experienced engineers, the sort of men who'll *insist* on the right to progress as fast as their abilities warrant.

Right now, aerodynamists with experience in Boundary Layer Control have a splendid opportunity with Fairchild to take part in Fairchild's pace-setting research and development in this vital field. The right men will be assured good futures, high salaries, and plenty of room ahead to progress in.

Send your resume today to Walter Tydon, Chief Engineer.

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FAIRCHILD
Aircraft Division
HAGERSTOWN, MARYLAND

"where the future is measured in light-years"

an added attraction, its engineers expect that use of steel will enable a substantial reduction in unit cost.

The Lear Model 2153 gyro is designed as the vertical reference for

remote attitude indicators, autopilots and bombing systems. Power requirements are 115-volt, 3-phase-400 cycle a-c, and 27.5-volt d-c.

Circle No. 49 on Reader Service Card

Turboprop Fuel Hose

Hewitt-Robins, Inc. has developed a new 2" dia. fuel hose having a special rubber no inner liner for handling kerosene fuels in aircraft servicing. It will be used by Shell Oil Co. in its servicing of Capital Airlines' Vickers Viscount turboprop transports.

The hose is reel-mounted for ease of handling. Outer covering is of tan rubber that will not mar aircraft exterior surfaces during fueling operations.

Circle No. 45 on Reader Service Car

Attitude Gyro

New electrically driven gyro designed to control attitude in aircraft or missiles having moderate to heavy vibration or steady-state accelerations has been introduced by Clary Multiplier Corp.

The Clary CG-100 gyro weighs 7.5 pounds and has 5¾" dia. and 6⅛" length. A d-c solenoid operated caging mechanism orients the gimbals with respect to mounting surfaces.

Circle No. 47 on Reader Service Card

Aircraft Inverter

A new 250-va aircraft inverter announced by Leland Electric Co., Div. of

Western Europe's Answer To The 'Knock Out' Attack

If—and when—war breaks out again the only warning we can count on is a radar signal flash.

One thing is certain. The days of thousand-bomber raids and official declarations of war are over for good. Security now lies in efficient systems of aircraft detection and the speed and fire-power of fighters that can fly in all weathers.

This is what makes the Gloster Javelin so important. It solves a critical operational need. The improved radar, fire power and extraordinary high rate of climb of this versatile aircraft puts new teeth into Europe's first line of defence against sneak raids.

No other all-weather day and night fighter packs such a big punch as the Javelin. And because of its highly sensitive integrated radar system, no other fighter is as quick and accurate in getting to the "trouble spot" in time.

Twin Armstrong Siddeley Sapphire engines thrust the Javelin speedily toward its prey. From the first flash of warning the Javelin can be attacking at over 50,000 ft. in a very few minutes. Refueling and reloading are also a matter of minutes.

It is true to say that no other all-weather fighter made anywhere has such range, speed or destructive firepower. In fact, the Javelin has already altered the pattern of defence in Western Europe's favour. This key aircraft was designed and developed by Gloster, makers of the world's first successful jet aircraft and one of the remarkable Hawker Siddeley Group of companies.

THE WEATHER

Widespread fog

Vigorous troughs of low pressure will move E. across the British Isles. It will be dry in some E. dist[illegible] fog affec[illegible] Isles [illegible]

follow the fog acros[illegible] during the afternoo[illegible] many N. areas of [illegible] Temperatures wil[illegible] normal. Winds w[illegible] and reach gale fo[illegible]

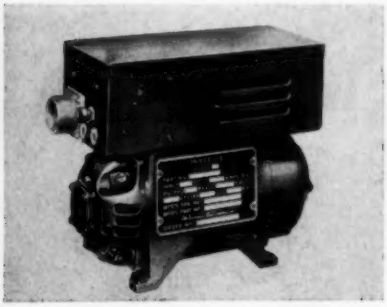
Fore[illegible] an[illegible]

DAY AND NIGHT ALL WEATHER FIGHTER

Gloster Javelin

GLOSTER AIRCRAFT CO. LIMITED, GLOUCESTER, ENGLAND. *Member of the Hawker Siddeley Group Pioneer ... and World Leader in Aviation*

American Machine & Foundry Co. weighs only 13 pounds and operates at full rating up to altitudes of 50,000 feet. The Leland Model SE-16-2 also is rated at half-load up to 65,000 ft.



Features include three dimensional shock-mounted electronic voltage and frequency regulator along with radio noise filters. Dimensions are 9-1/16" x 7-11/32" x 4-9/16".

Circle No. 48 on Reader Service Card

Non-Woven Material

The Felters Co. has introduced a new non-woven material made of textile fibres with a resin binder. Called AllFab, it is designed to serve a variety of purposes ranging from a filler for vinyl coated materials in interior furnishing to shock absorption applications.

Initial production is in thicknesses from 1/16" to 2". Density of the material is controlled by the ratio of resins to fibres and can be varied from a springy fluffiness to high densities.

Circle No. 56 on Reader Service Card.

Passenger Seat

New 51" span passenger seat developed by Teco, Inc. for Trans World Airlines' Lockheed 1049G Super Constellations features "research-improved" use of polyester foam in seat and back rest cushions and new type seat controls. Formed thermo-plastic panels are used

widely throughout the design.

Standard seat is designated model TE-403 and berthable type model TE-404. Both are track mounted. Literature available.

Circle No. 51 on Reader Service Card.

Drinking Cup

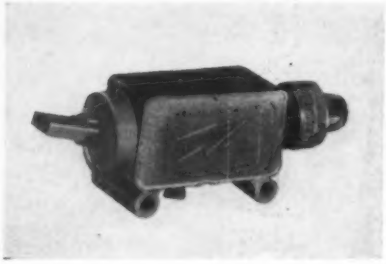
A new non-spill drinking cup designed for airline beverage service has been introduced by Kramer Cup Co. It is being adopted by Continental Air Lines this spring as a standard passenger service item.

Constructed of Bakelite C-11 plastic, the "Kramer-Kup" features a sliding top that prevents spillage under turbulent flying conditions. The C-11 plastic is resistant to stain and can be cleaned in automatic dishwashing equipment at temperatures up to 200°F without fear of distortion.

Circle No. 53 on Reader Service Card.

Ice-Proof Switch

Electro-Snap Switch & Mfg. Co. has unveiled a new hermetically sealed aircraft switch that will reset even when coated with ice. Rated at 10 amperes for 125/250 volt a-c and 28 volt d-c inductive and resistive loads, the new



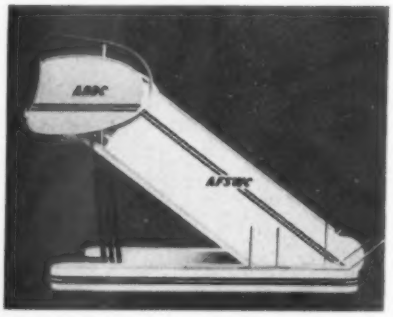
switch is said to have a mechanical life of 200,000 cycles.

Feature of the new design is the added flexibility provided by arranging the wiring conduit opposite the actuating mechanism. Included in a variety of available actuators are roller, leaf and cam types.

Circle No. 52 on Reader Service Card.

Passenger Ramp

First military version of Texas Metal and Manufacturing Co.'s Tex-Met Sky Ramp has been delivered to the U. S. Air Force Special Weapons Command. Designed for use with Constella-



tion, DC-4, DC-6 and DC-7 type transports, the new ramp also is in operation by Pan American, Trans World and Northwest Airlines.

The Tex-Met ramp measures 221" long and 93" wide. Maximum overall height is 175" and minimum height is 119". A hand pump-operated 2½"-hydraulic ram varies the platform height from 90 to 135".

Circle No. 55 on Reader Service Card.

WORTH INVESTIGATING!

Excellently located modern airport.

20 minutes to Washington, Baltimore, available for lease—

FEATURES INCLUDE:

Two 4000 ft. paved runways
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Steel hangar
110' x 100' with 20' lean-to
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508 acres with railroad siding
One 60' x 24' steel building
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Administration building
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Ideal for manufacturer of aircraft or aircraft parts, engine overhaul firms or modification specialists.

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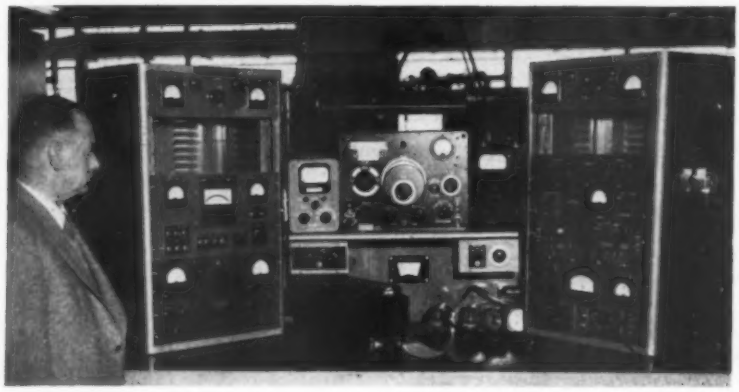
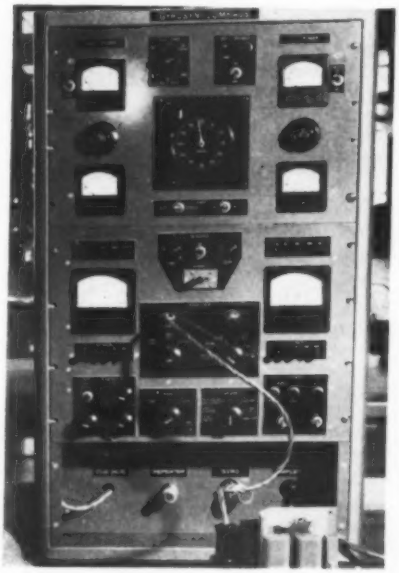
Circle No. 23 on Reader Service Card.

Maintenance Bulletin Board

TCA Cuts Radio Overhaul Test Time



A battery of new test units designed to cut manpower in the overhaul of airborne electronic units by more than 50% has been developed by Trans-Canada Air Lines. They eliminate former time-consuming methods of checking radio equipment with a kit of tools —a process that called for individual handling of each component.



Three electronic testers already in use at TCA are a VOR test console, one for checking Gyrosyn compass systems, and another for VHF communications transmitters. The VOR console also can be used to check out localizer receivers, and Collins glidescope receivers, and the complete ILS system.

In the mill are other testers for handling Simmonds Pacitron fuel gage systems, for Marconi automatic direction finding equipment, and for Collins 618S-1 transceivers.

Spearheading the project at Trans-Canada are J. P. Millar, electronic engineering system chief, and Duncan G. Mackenzie, engineer.

With the introduction of new Constellation and Viscount transports, the airline was without adequate test equipment to handle the new electronic equipment. Attempts to procure the test devices were fruitless—nothing was available to meet its needs.

The testers designed by Mackenzie were the answer. They permit a check of an entire unit by simply plugging it into the test set. Where a control panel previously required two hours to test, the same work is done in 30 minutes.

Douglas PLI Washer

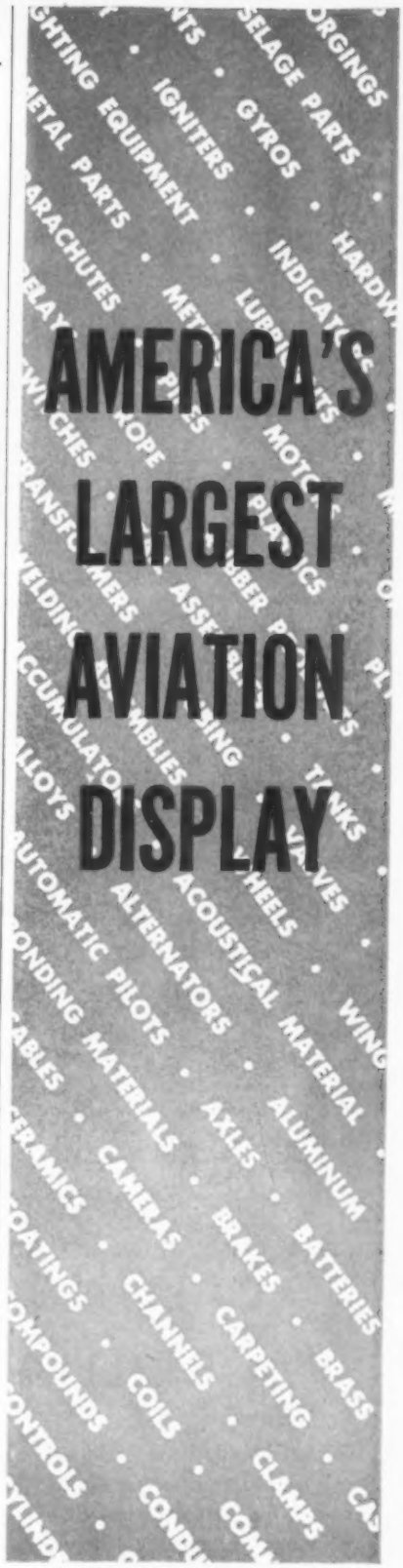
Douglas Aircraft Co. has licensed Standard Pressed Steel Co. of Jenkintown, Pa. to produce its new Pre-Load Indicating (PLI) washer.

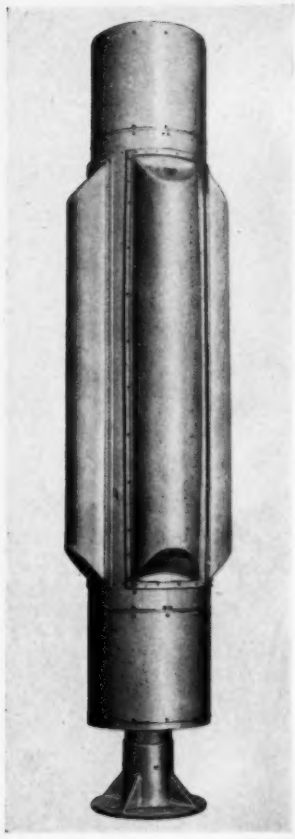
The Douglas development eleminates the need for torque wrenches (AMERICAN AVIATION, June 7, 1954). It is now in use on DC-6B and DC-7 transports on bolts at major fuselage and wing section attach points.

Welding Titanium Rig

The wonder metal titanium, in its broad invasion of virtually every area of aircraft manufacturing, has intro-

Circle No. 25 on Reader Service Card. →





The Type 2602-E

VOR *antenna**

has these important advantages

- no moving parts
- can be installed in a few hours
- no field adjustments
- used successfully both in the U.S.A. and in other countries
- frequency range — 108 mc to 118 mc
- shipped completely assembled, and tuned when frequency is specified
- can be readily retuned to any frequency within its range
- net weight — approximately 140 lbs.

Write for Bulletin # AA-554.

*Original model was developed for the Air Navigation Development Board.

AMCI ANTENNA SYSTEMS – COMPONENTS – AIR NAVIGATION AIDS – INSTRUMENTS

ALFORD *Manufacturing Co. Inc.* 299 ATLANTIC AVE. BOSTON, MASS.

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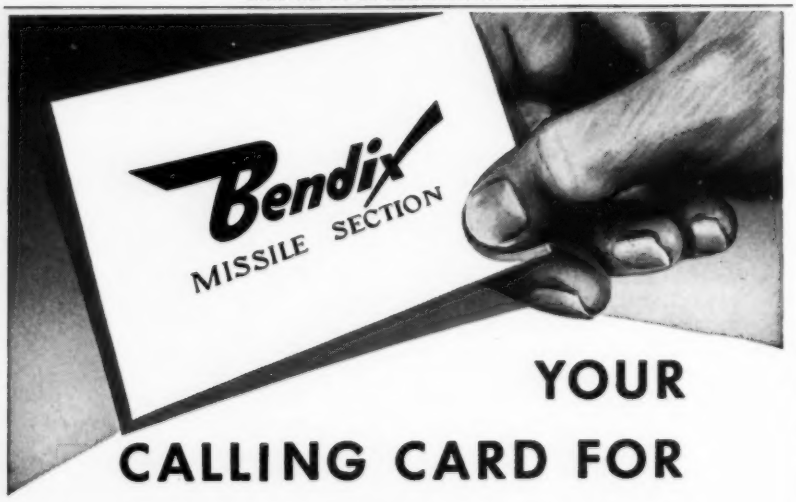


YOUR CALLING CARD FOR A BRILLIANT FUTURE...

Bendix Missile Section is a major contractor in the U. S. Navy's guided missile program--a part of the "new look" in our defense plan. Our expanding program has many opportunities for senior engineering personnel: Electronics Engineers, Dynamicists, Servo-Analysts, Stress Analysts, Project Coordinators, and Designers. Take time now to look into the opportunities which Bendix can offer you. Write Employment Dept. M, 401 Bendix Drive, South Bend, Indiana.

Circle No. 26 on Reader Service Card.

duced a new breed of metal working problems.

Titanium fusion welding has proved no exception. By its nature, the molten metal absorbs such gases as oxygen, nitrogen and hydrogen that tend to make a weld brittle. To overcome this air is kept away from the weld and the work is bathed with an inert gas in

what constitutes a controlled atmosphere.

The answer developed by Solar Aircraft Co., Des Moines, Ia. is a gas-tight zippered plastic tent that is fastened to a standard welding table. For freedom of movement, the welder wears long-sleeved rubber gloves that are sealed to the vinyl bag, while the atmosphere inside the tent can be carefully controlled to guarantee perfect welds.

Northrop TelAutograph

When a report of a part shortage is sent from the shop to the control area, master records can be consulted immediately to discover whether the item is available in other parts of the plant, or to initiate other action to eliminate the shortage.

Eight machines in Central Control are linked to 37 units scattered throughout the plant, each outlying machine serving four or five work areas. As presently set up the system has a capacity of 60 units. The equipment can operate over distances up to 12 miles.

Shortage reports from outlying factory locations are being speeded to a central control point at Northrop Aircraft, Inc., by a new system of automatic writing machines. The devices, called TelAutograph telescribers, reproduce handwritten messages as they are being written, through electrical impulses transmitted over wires. They are common in transportation companies, hotels, and banks. With the high-speed communications system Northrop expects savings of $175,000 annually in production of the F-89 interceptor and the Snark missile.

Technical Literature

INSTRUMENT SYSTEM. 4-page brochure available from Sperry Gyroscope Co. describes its new Integrated Instrument System including C-6 Gyrosyn Compass, R-1 Pictorial Deviation Indicator and HZ-1 Horizon Flight Director.
Circle No. 100 on Reader Service Card.

VISIBILITY MEASUREMENTS. Ceilometer and transmissometer equipment for airports are described in an eight-page bulletin (#2675) published by the Crouse-Hinds Co.
Circle No. 101 on Reader Service Card.

RADAR. Antennae, mounts, and accessories for radar systems are shown in an eight-page bulletin (#GEA-6279) available from General Electric.
Circle No. 102 on Reader Service Card.

HEAVY PRESSES. The production capabilities of the 12,000- and 8,000-ton extrusion presses of Harvey Aluminum are outlined in an illustrated brochure. Information includes minimum thicknesses, cross-section limits, etc.
Circle No. 103 on Reader Service Card.

FUEL TANK. A plastic fuel tank made of glass-fiber resin offers corrosion resistance, according to an eight-page booklet from Pastushin Aviation Corp.
Circle No. 104 on Reader Service Card.

DYE PENETRANTS. How to perform inspections for cracks by use of colored penetrants is described in detail in a 12-page booklet from Turc Products.
Circle No. 105 on Reader Service Card.

NAMEPLATES. The C&H Supply Co., manufacturer of Metal-Cals, is distributing a four-page leaflet describing the varied applications for those pressure-sensitive adhesive aluminum labels.
Circle No. 106 on Reader Service Card.

CONNECTORS. The line of Blue Ribbon connectors manufactured by the American Phenolic Corp. is described in a new catalog (R1). Electrical and mechanical data.
Circle No. 107 on Reader Service Card.

SHOCK MOUNTS. Basic information on vibration and design data on particular isolators is provided in a 12-page booklet (616) published by the MB Manufacturing Co., Inc.
Circle No. 108 on Reader Service Card.

HOLES & CONTOURS. A 424-page, fully illustrated book, featuring excellent photography, explores jig grinding of contours, slot grinding, etc. List price $7.50; to the metalworking industry in the U. S., $5.00; $6.00 elsewhere. Orders should be placed with the Moore Special Tool Co., Bridgeport, Conn.

TITANIUM TUBING. New product bulletin (TD 115) describes two grades of titanium tubing and pipe, listing properties, machining characteristics, etc. Published by Alloy Tube Division, Carpenter Steel Co.
Circle No. 109 on Reader Service Card.

SLIDE RULE. New Jamming Power Slide Rule developed by The W. L. Maxson Corp. provides short-cut for countermeasures engineers or military personnel in determining power needed to obscure radar reflection from an aircraft carrying jamming equipment. Limited free distribution.
Circle No. 110 on Reader Service Card.

PRECISION SWITCHES. 28-Page catalog No. 62 lists specifications on precision snap-action basic switches produced by Micro Switch Div. of Minneapolis-Honeywell Regulator Co.
Circle No. 111 on Reader Service Card.

FACILITIES BROCHURE. Avien, Inc. illustrates its aircraft and missile research, development, and design facilities in new 16-page booklet entitled "Thrust."
Circle No. 112 on Reader Service Card.

ALUMINUM FASTENERS. 8-page booklet available from Aluminum Co. of America describes its line of aluminum fasteners and screw machine products.
Circle No. 113 on Reader Service Card.

SWITCHES-RELAYS. New 32-page catalog published by Sealectric Switch and Relay Div., Williams Mfg. Co., covers its complete switch and relay line.
Circle No. 114 on Reader Service Card.

MISSILE MOTOR. Technical Bulletin F-6560 covers specifications on Model FYLZ 3816 linear torque motors for missile hydraulic-servo systems: Barber Colman Co.
Circle No. 115 on Reader Service Card.

MINIATURE MOUNTS. Barry Corp. illustrates its complete line of Series M24 All-Metal vibration isolators in Bulletin No. 542.
Circle No. 116 on Reader Service Card.

PRECISION DIALS. New series of standard precision engraved dials are listed in 44-page catalog by Ackerman Engravers.
Circle No. 117 on Reader Service Card.

METAL FORMING. New 31-minute color movie on the radial draw process of metal forming is available from The Cyril Bath Co., Dept. Amerav, 32386 Aurora Road, Solon, O.
Circle No. 118 on Reader Service Card.

PRECISION INSTRUMENTS. 20-page booklet published by Daco Machine & Tool Co. describes its facilities for design, tooling and production of high precision instruments.
Circle No. 119 on Reader Service Card.

STRAIGHTENER. A new variable speed Model 208 straightener for thin coil stock is covered in leaflet by F. J. Littell Machine Co.
Circle No. 120 on Reader Service Card.

Capital Airlines

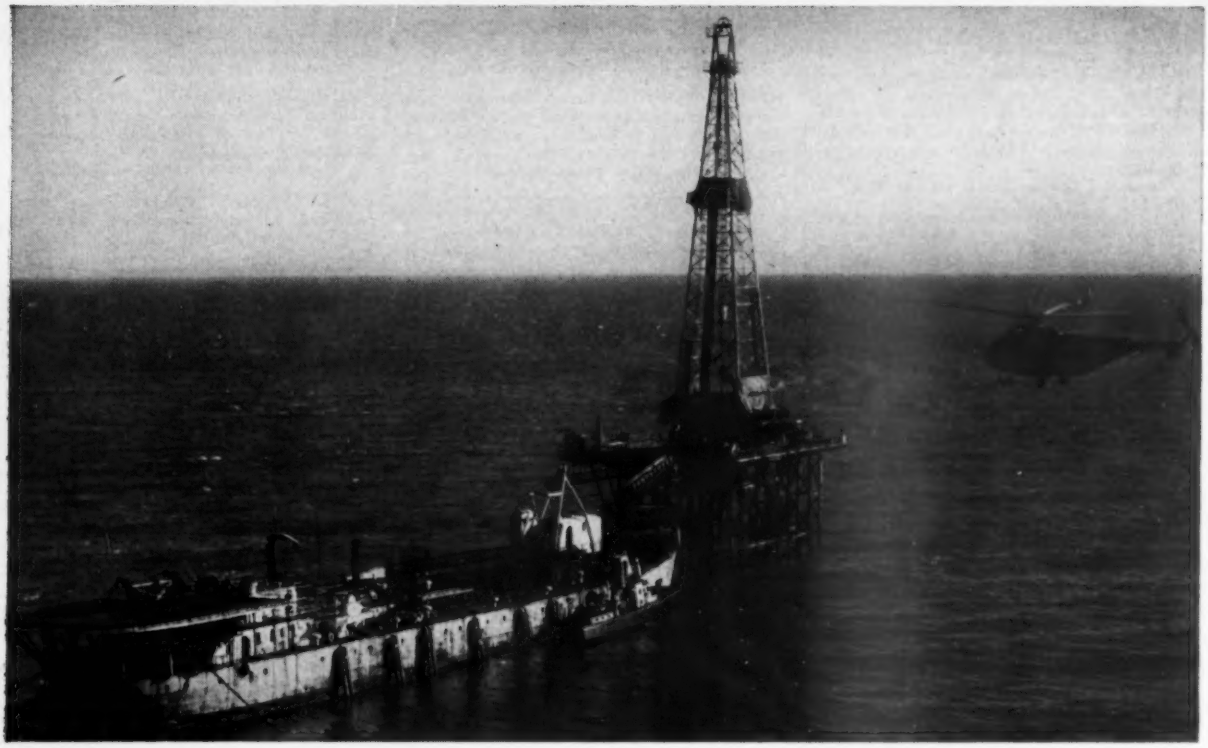
VISCOUNT

POWERED BY ROLLS-ROYCE

The Vickers Viscount is manufactured by Vickers Armstrongs Limited

ROLLS-ROYCE AERO ENGINES FOR SPEED AND RELIABILITY

ROLLS-ROYCE LIMITED · DERBY · ENGLAND



OFFSHORE AIRBUS—Going to and from work in Sikorsky helicopters is now routine for crews drilling oil wells offshore. In the Gulf of Mexico, helicopters have made as many as 2000 scheduled flights a month for one company alone. They have introduced new operating methods offshore. Here, an S-55 nears a tender's landing platform.

AROUND THE WORLD WITH SIKORSKY HELICOPTERS

NEWFOUNDLAND PATROL—This commercial Sikorsky S-55 now regularly polices Newfoundland's extensive coastal waters, on duty with the Fisheries Department of Canada. Speed, versatility and rugged stamina of the big Sikorsky make it an ideal vehicle, especially for work in remote areas where surface travel is difficult.

NORTH SEA RESCUE—In mid-January, 16 crewmen from a Norwegian freighter, grounded on the coast of Holland, were rescued by the Royal Dutch Navy helicopter shown above with one of the rescued men. The big Sikorsky, an S-55 Navy version from a Dutch aircraft carrier, made five quick flights to carry the men to the beach.

TREE-TOP MINING PROSPECTOR—Modern electronics and Sikorsky's S-55 commercial helicopter are combined in a new aerial prospecting technique developed by Aero Service Corporation, Philadelphia. Data on underground mineral-bearing formations are disclosed by magnetometer, flown over an area at tree-top height. Such geophysical surveys are far faster, reveal more and cost less than slow ground studies.

HELICOPTER HISTORY:

America's first world helicopter record—set by Sikorsky's VS-300

MAY 6, 1941—Flying his historic VS-300, Igor Sikorsky, nearly 14 years ago, remained in the air for 1 hour 32 minutes 26 seconds, to bring America her first world helicopter record.

The VS-300 was first of the many Sikorsky achievements in advancing helicopter design, development and production.

SIKORSKY AIRCRAFT

BRIDGEPORT, CONNECTICUT

One of the Divisions of United Aircraft Corporation

Air Force Wants Simulators on the Line At Same Time as Aircraft They Represent

Air Force has disclosed new contractual demands on aircraft builders intended to bring about closer coordination between flight simulator manufacturers and the plane producers.

A major problem has been that simulators today still are divorced to a great degree from the airplane they represent. USAF hopes to dispel the notion that they are separate pieces of support equipment.

Under Air Force's new program, Air Materiel Command will buy a performance specification for a prototype flight simulator with each new airplane it orders. Idea is to speed up procurement of the training devices and to insure a more representative simulator at the outset.

This was one of the major problems discussed at a recent Flight Simulator Conference in the Pentagon attended by more than 100 industry and military representatives.

AMC officials stressed the responsibility of the airplane manufacturer in USAF's rapidly expanding simulator program.

Aircraft manufacturers also may be asked to furnish: (1) a test outline for the simulator to be procured, (2) engineering services to support the simulator tests, and (3) a final test report.

Need for liaison has become increasingly apparent with the growth of the simulator business, it was pointed out. Since Korea, Congress has approved more than $400,000,000 for flight simulators, and for radar bombing, navigation and gunnery trainers.

Air Force now has 215 flight simulators under procurement with more than 100 others already delivered to operating units—a firm indication that this relatively young program is about past the adolescent stage. Of the 215 on order, 131 represent fighters, 46 bombers and 38 cargo aircraft. They represent a total dollar value of $141,000,000 with unit prices ranging from $250,000 to $2,000,000.

During the session, three special groups discussed and firmed up recommendations on the programming, modification and development of flight simulators.

PROGRAMMING

Discussion centered on whether an initial simulator should be built for exclusive use as an engineering prototype simulator or programmed for operational use. Consensus was that it is necessary to have an engineering prototype, from the scheduling standpoint, for each weapon system. However, no firm decision was reached on this point, which requires an Air Staff (Director of Research and Development) decision.

Airframe manufacturers indicated a need for orders for parts and subassemblies they are to furnish for the initial simulator at the time a contract is let for the development aircraft. Recommendation was that this problem be resolved by AMC.

It also was recommended that the performance specification for a flight simulator be based on the airframe model specification, and ordered at the same time that a development contract is awarded to the weapon system contractor. This performance specification would be delivered to the Air Force for approval not later than 90 days after the airframe contract date.

MODIFICATION

The modification group devoted most of its effort to a six-point proposal by AMC for handling engineering changes. It endorsed AMC's plan as a suitable basic structure from which could be developed successful modification for both in-production and in-service flight simulators. Included in the proposal were these features:

● *Aircraft and flight simulator in simultaneous production*—Here, AMC would provide for engineering changes in each simulator contract and a clause will require the manufacturer to provide qualified engineering personnel to the airframe contractor. Under this procedure, the simulator builder could submit an engineering change proposal (ECP) virtually at the same time the airframe contractor submits aircraft ECPs.

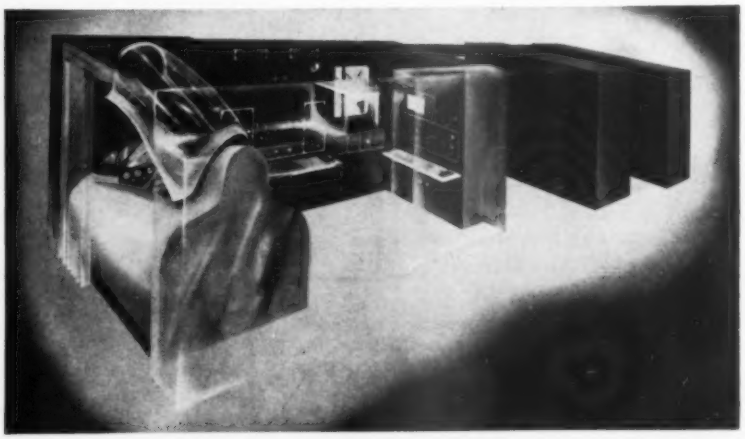
If the simulator contractor finds it necessary to start modification work immediately, he may do so *without approval from the Air Force or anyone else.* A Significant and new procedure, AMC officials believe this will correct many of the delays that have been inherent in the program.

● *Aircraft in production and simulator in production and service*—Same procedure as above with this addition: At the time the simulator manufacturer begins modification and notifies the procuring contract office, he also will notify the Director of Maintenance at Ogden Air Materiel Area (which handles all in-service modification of special training devices) about changes that affect in-service simulators. Thus, immediate action will be taken to insure that the proper contractual authority is provided if changes to in-service simulators are required.

● *Aircraft in production and simulator in service*—AMC proposes that a maintenance modification contract between Ogden and the simulator producer be written so it would be in effect at the time simulator production contract is completed. Money would be budgeted for this purpose in advance and available for use as required. However, close coordination between the airframe and simulator manufacturer would be essential to insure timely solution for in-service modifications, AMC officials said.

● *Both aircraft and simulator in service*—When AMC recommends to USAF headquarters that in-service aircraft be modified, it will also recommend corresponding changes to in-service simulators. This, in effect, would mean that headquarters would be directing modifications of both aircraft and simulator simultaneously.

● *Aircraft in service and simulator*



FIRST AF supersonic simulator (above) for North American F-100A is being produced by Union Switch & Signal Div., Westinghouse Air Brake Co. Prototype was built by Melpar, Inc.

in production—This would be handled in the same manner as the previous problem area. Since a contract is in existence with the simulator manufacturer, authorization can be given simply by contract amendment.

• *Aircraft having no effect, flight simulator in service*—When a command requirement calls for changing in-service flight simulators from one series designation to a later one, the using command would make this known to Air Force headquarters. This office then would budget funds and direct procurement to AMC, which in turn would coordinate with Wright Air Development Center and request that Ogden contract directly with the simulator builder.

DEVELOPMENT

Principal recommendations in the simulator development area included:

• That Air Research and Development Command publicize the steps in the development cycle of training equipment in a format similar to the WADC publication "Development Life Cycle of a Weapon System."

• That weapon system contractors who now prepare general performance specifications and changes also prepare detailed performance specifications for follow-on procurement.

• That the newly-formed Flight Simulator Committee of the National Security Industrial Association (NSIA) prepare a document describing the type and form of data required in the design of a flight simulator.

• That the NSIA committee submit to the Director of Research and Development a letter re-evaluating and bringing up to date recommendations for technical development submitted by individual companies last year, incorporating relative priority, and recommending a time schedule of accomplishment.

Company officials appeared to be in agreement that "an insufficient effort" has been applied to R&D in the simulator industry, principally due to lack of fund allocations and lack of incentive for manufacturers to spend time or money on new developments. • • •

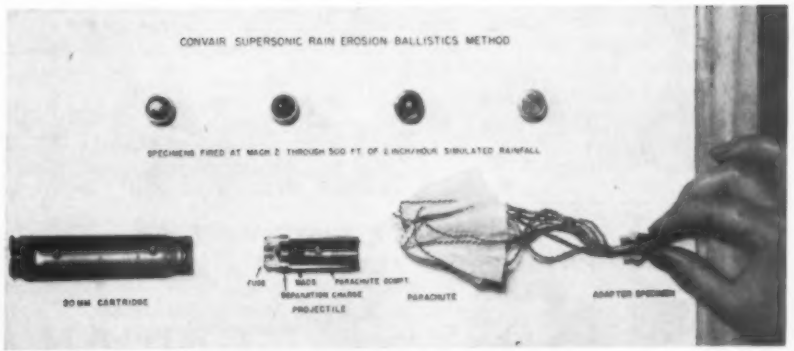
How Convair Conducts Rain Erosion Tests

A LOW COST METHOD of conducting tests of rain erosion on aircraft materials is in use at Convair. Since some materials survive only for a matter of seconds while traveling at or above the speed of sound in rain, the gathering of data on rates of erosion is of considerable importance.

Convair engineers solved one part of the problem by mounting test specimens in the projectiles of 20 mm aircraft cannon. As the modified projectile leaves the muzzle of the cannon, a fuse is ignited and burns for approximately ¾ second. A separation charge then ignites, ejecting from the nose of the projectile the test specimen, with a six-inch parachute attached. The parachute slows the specimen to a stop in 10 feet.

During a "flight" of approximately 1500 feet the specimen passes through an artificial shower 500 feet long, created by a sprinkler pipe mounted three feet above the ground. The sprinkler creates a uniform rainfall of two inches per hour. Specimen speeds can be varied from Mach 1.0 to Mach 2.5. Round-nose and flat-nose specimens are being tested, with the most promising materials selected for further study in large-scale tests. • • •

CARTRIDGE IS INSERTED into 20 mm aircraft cannon.



COMPONENTS of test projectile and four specimens are shown above.

EFFECT OF RAIN on specimens; note far right.

NORTH AMERICAN HAS BUILT MORE AIRPLANES THAN ANY OTHER COMPANY IN THE WORLD

Engineers: North American offers unusual opportunities. Write: Engineering Personnel Office, Los Angeles or Downey, California; or Columbus, Ohio.

READY! AMERICA'S FIRST SUPERSONIC SQUADRONS

North American F-100 Super Sabres—now on active operational duty with the 479th Fighter Wing at George Air Force Base, Victorville, California—form America's first Supersonic Squadrons . . . a powerful new defense force unequalled anywhere in the world.

Exemplifying a totally new concept for modern air power, the North American designed and built F-100 Super Sabre flies beyond the speed of sound in level or climbing flight, and is designed to perform equally well in air combat or close-support bombing missions.

This year, to better meet our Air Force needs, North American will produce F-100 Super Sabres at its Columbus, Ohio plant in addition to continued production at Los Angeles.

Constant research and development keep North American foremost in aircraft, rocket engines, guided missiles, electronics and peaceful applications of atomic energy.

ENGINEERING AHEAD FOR A BETTER TOMORROW

NORTH AMERICAN AVIATION, INC.

TRANSPORT TRENDS

Washington, D. C., April 11, 1955

MUCH TALKED ABOUT REORGANIZATION of the Military Air Transport Service (MATS) is again in the wind, this time stronger than ever. Congress-sponsored Hoover Commission has come up with some healthy recommendations on how the joint-service activity should be operated.

But unlike past appraisals, MATS alone does not bear full brunt of criticism for the inefficiencies of present handling. Navy's Fleet Logistics Air Wings and Air Materiel Command's Logair are bruskly accused of "empire building" and undermining attempts to coordinated military air passenger transport by MATS.

CRUX OF THE COMMISSION'S REPORT is that Defense Department should make maximum use of commercial air carriers and sharply reduce MATS operation. Duplicating operations of Navy's FLOG and AMC would be eliminated by merging these activities into MATS.

Revamped organization to control future operations would be centered in Department of Defense Director of Transportation under Asst. Defense Secretary-Supply & Logistics. Office would direct all traffic management activities, both passenger and freight, in all military services.

Peacetime MATS operation under revised organization would be restricted and realistically limited to persons "carefully evaluated" as to the need for military air transportation. Use of Service transport would be authorized only after commercial carriers have been utilized to the maximum extent practicable.

IMPACT OF THE PROPOSED CHANGES on civil air carriers would be widespread. Commission's task force estimates that if 25% of passengers and 50% of mail carried by MATS in fiscal 1954 were diverted to U. S. international carriers, subsidy needs would have been cut some $42.9-million, about 88% of the total amount paid.

Commission's concern for the healthy status of commercial carriers was justified by the necessity of an expanding civil reserve air fleet. Estimated cost to the Defense establishment of acquiring the 317 transports now in the Civil Reserve Air Fleet was placed at $425-million.

FIRST MAJOR BREAK IN AIRLINE PROCUREMENT of airborne weather radar has come, as expected, from United Air Lines. United, which pioneered the development of C-Band radar with Radio Corp. of America, has placed a $2.5-million order with RCA for 200 radar units to equip its entire operating fleet.

Total outlay for the radar project at UAL eventually will reach $4 million when modification and installation costs of $1.5 million are included. First aircraft to be radar-equipped are slated to enter service this fall.

DOMESTIC TRUNK AIRLINES, which have been on an open rate status for service mail pay since April 1, 1954, have reached agreement with the Post Office on a new rate structure that will cut annual mail revenues about $5.3 million. It may become effective this month.

Under a new multi-element type pay structure, average rate for Big Four carriers will be 37 cents per ton-mile, and for industry in general about 38.5 cents. Ratio of line haul to terminal service charges under the multi-element formulae will be 80% to 20%.

Another turboprop first by Aeroproducts!

NAVY R3Y TRADEWIND WITH AEROPRODUCTS TURBOPROPS COMPLETES RECORD HOP!

Convair eighty-ton cargo-transport, powered by Allison gas turbine engines and Aeroproducts turbopropellers, flies coast to coast in six hours for seaplane record

Aeroproducts turbopropellers made flight history again February 24 when they helped power the Navy's giant R3Y Tradewind on the first cross-country hop of a turboprop seaplane. The 80-ton Tradewind flew non-stop from San Diego, California, to Patuxent River, Maryland, in six hours.

A cargo transport, the R3Y sets the trend toward wide use of turboprop engines and turbopropellers. This pioneering flight also marks another first for Aeroproducts. In 1945, an Aeroproducts turbopropeller was used on a Convair F-81 in the first flight of a turboprop-powered plane in the United States. In fact, Aeroproducts turbopropellers have more flight time than any other American-made turbopropellers.

But turbopropellers are just a part of Aeroproducts' contribution to safer, more efficient flying. Aeroproducts is ready *now* to meet your specifications for other propellers, air-driven emergency generators, air-driven hydraulic pumps, actuators, other aircraft components still in the development stage. Call or write for details.

General Motors engineering leads the way

GM GENERAL MOTORS

Building for today...Designing for tomorrow

Aeroproducts

ALLISON DIVISION OF GENERAL MOTORS • DAYTON, OHIO

Transport Aviation

Rizley Opens Drive Against Pressure on CAB

By WILLIAM V. HENZEY

THE WELCOME MAT is out at Civil Aeronautics Board for industry officials desiring to make friendly visits, but if the caller has in mind discussing a pending case with any Board member or staff official his visit would be better unmade.

This is one of the most emphatic phases of new Chairman Ross Rizley's initial drive to rid CAB of the pressures, leaks and sometimes indiscretions which have made the agency's prestige so vulnerable to criticism in the past decade.

Other efforts in this direction include: (1) more unanimity among Board members; (2) a new bipartisan flavor not previously apparent during the Eisenhower Administration; (3) speedier handling of cases, and (4) important personnel changes.

• **As a backstop** for his policy to elevate CAB to the "judicial status" it should occupy, Rizley has dusted off the code of ethics adopted by the Board four years ago but virtually forgotten until now. He told AMERICAN AVIATION he intends to "follow religiously" that code which was designed as "a guide for all parties and the Board and its staff in relation to proceedings before the Board."

During his first month in the top CAB spot, the former Oklahoma Congressman has received requests from industry officials for private off-the-record meetings. In his answers to those who indicate matters pending before the Board may be involved, he politely but firmly advises that such discussions would not be advisable.

At a luncheon during his first month in office, Rizley stiffened when the conversation with several industry leaders turned to a pending case and informed them he could not discuss such matters. In another instance, he advised one official who brought up some "new facts" that perhaps the case should be reopened to give the opposing side a chance to rebut.

• **Rizley took all CAB staff chiefs** to lunch late last month for the purpose, among other things, of defining the conduct expected of them in relation to matters still undecided. Informally, other Board members have been made aware of the policy.

Target, of course, is the general type of lobbying which not only had become common in recent years, but a defensive necessity for parties who, after fighting cases through normal steps, felt remiss in not keeping up with their competitors in "processing" the cases through individual offices of Board members or staff officials.

Rizley said he feels the great majority of industry officials will appreciate the policy which also has the solid backing of the White House. Other CAB members who have been put on the spot by the generally loose policy against lobbying in the past, also stand to benefit.

• **In this regard,** the harmony, or lack of it, on the Board has taken a new turn. Democrats Josh Lee and Joseph P. Adams, authors of fighting dissents during their two years of virtual exile under the Republicans, appear happier with their lot under Rizley.

For one thing, Adams, a four-year veteran, has been elevated to the vice-chairmanship, marking the first time under the Republicans that a Democrat has been so honored. During the two previous years, Republicans have occupied both the chairmanship and vice-chairmanship.

Ordinarily, on a seniority basis, 12-year veteran Josh Lee would be given the No. 2 role, but Lee, like Rizley, is from Oklahoma and it was deemed wiser not to have two from the same State in the two top spots.

Also, Adams is from the State of Washington, home State of Senator Magnuson, chairman of the powerful Senate Commerce Committee, and the Adams designation did nothing to harm the Board's relations with that committee.

• **In sponsoring the return** of a bipartisan flavor to the Board, however, Rizley is walking a tight rope to keep Republicans Chan Gurney and Harmar D. Denny, last year's chairman and vice-chairman, respectively, from feeling like a minority faction.

UNITED, JUDICIOUS, BIPARTISAN! CAB Members pose for their first group picture under the leadership of Republican Chairman Ross Rizley and Democratic Vice Chairman Joseph P. Adams. Left to right: Adams, Chan Gurney, Rizley, Josh Lee, and Harmar D. Denny.

On several internal matters, the Board has voted 3-2 with Gurney and Denny on the losing side. However, some recent important actions, most notably one in the controversial New York-Mexico City Nonstop Case, have been unanimous votes. The order in the Mexican Case, dealing with an Eastern Air Lines' request for subpoenas, was the first without a dissent in the 14-month history of the case.

Emphasis also is on speedier handling of cases, with insiders reporting that much less time is now spent in private Board meetings where decisions are made.

Rizley also hopes to expedite international decisions through the Board and through the White House.

• **The first major** overseas proceeding being decided under his reign—the States-Alaska Case—will be the tip-off. Dragged out for months, this case could move to a final Presidential-signed decision within the next month.

Personnel-wise, Rizley is making full use of his executive director, Raymond Sawyer. Past chairmen have been criticized both for over-utilization and under-utilization of that post.

New names also important in the operation are Rizley's administrative assistant, Robert Kunzig, and new general counsel, Franklin M. Stone.

Rizley took over the CAB post with a reputation of being a top trouble-shooter for the Administration. To date he has been very active in fulfilling the White House's open desire for a judicious CAB. Of equal importance to the airline industry, however, are the philosophies which will guide his vote in economic cases. These are not apparent yet in the short time he has been in office. But the success of his appointment hinges equally as much on his economic outlook as his administrative ability. • • •

Congress Committees Favor Permanent Certification of Local Service Lines

Legislation providing for permanent certification of local service airlines may be the first major aviation measure to be enacted into law during the 84th Congress.

Both the Senate and House Commerce Committees have reported favorably on bills which would require permanency for the locals.

Fourteen local service carriers would be affected: Allegheny Airlines, Bonanza Airlines, Central Airlines, Frontier Airlines, Lake Central Airlines, Mohawk Airlines, North Central Airlines, Ozark Airlines, Piedmont Airlines, Pioneer Airlines, Southern Airways, Southwest Airways, Trans-Texas Airways and West Coast Airlines. By the time the legislation is enacted, however, Pioneer will have completed merger with Continental Airlines, a trunk airline.

• **Both House and Senate bills** require the Civil Aeronautics Board to issue permanent certificates of public convenience and necessity to the local carriers which apply within 120 days after enactment.

One important difference between the two versions will have to be composed, however—either on the floor of the House or Senate or in conference following passage of the two bills. The Senate bill permits Civil Aeronautics Board to limit the duration of the certificates in the case of up to one-half of the intermediate points served by the carrier. The House bill contains no such provision. The committee explained that section 401 (h) of the Civil Aeronautics Act, vesting the CAB with the power "to alter, amend, modify, or suspend" certificates, provides the Board with sufficient flexibility for proper route development.

Granting that fact, the Senate committee nevertheless insisted that undue delays would be prevented by allowing CAB to make necessary adjustments at the time of issuing permanent certificates, rather than forcing them into involved section 401 proceedings. The committee agreed with the Board and Commerce Department that "there may be some intermediate points on the present temporary certificates of some local carriers which have not yet demonstrated the need for the service."

• **The Senate bill** also provides that applicants must show they were a carrier furnishing passenger, property and mail service from Jan. 1, 1953, to the date of their applications, rather than from the date of the enactment of the bill, as provided by the House.

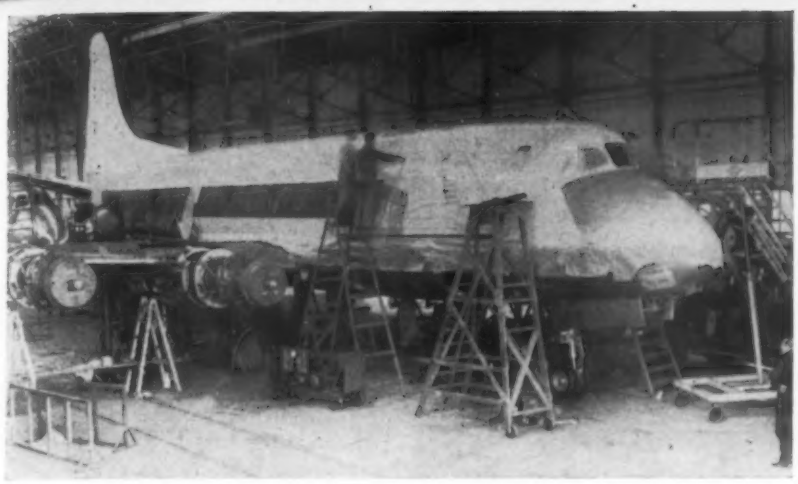
Both bills require the Board, before it can deny permanent certification, to show that during the period since its last certification the service rendered by the applicant had been inadequate and inefficient.

The two committees felt strongly, their reports stated, that permanent certification for local service carriers was "long overdue." They agreed that many benefits would flow from the increased carrier security: fewer appearances before the Board, saving of re-certification expenses, greater assurance for investors, manufacturers, communities, etc. interested in local service airline transportation, and increased opportunity for long-term planning by the carriers in all phases of their operation.

• **Both groups stressed** the present lack of suitable equipment designed especially for local service-type operations, and expressed the hope that permanent certification would stimulate manufacturers and designers to produce such an aircraft.

The Senate Commerce Committee took occasion in its report to express its "great admiration for the pioneering efforts of the three certificated metropolitan helicopter carriers." • • •

DOUGLAS C-133 T34-powered turboprop transport is on the classified list in the U. S. The above illustration appeared in the April issue of the Japanese aviation magazine Aireview. The publication gives its gross weight as 400,000 lbs.; payload 110,000 lbs.; range, 6000 miles; and maximum speed, 400 mph.



CAPITAL'S FIRST VISCOUNT, photographed at Vickers Hurn plant several weeks ago, is almost ready for delivery.

TCA Introduces the Viscount

By ANTHONY VANDYK

TRANS-CANADA AIR LINES introduced the Vickers into scheduled service in North America at the beginning of this month, and the turboprop transport now is a regular sight at New York, Montreal, Toronto, Fort William and Winnipeg. With five of its 22 Viscounts delivered, TCA is currently operating six roundtrips daily with the aircraft: five between Toronto and New York, and one between Montreal and Winnipeg via Toronto and Fort William.

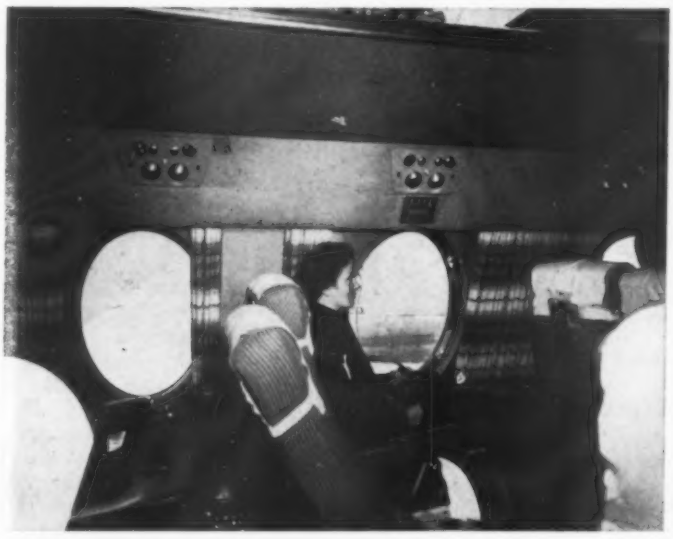
TCA's initial Viscount operations are but a foretaste of what the North American passenger will be able to utilize by mid-summer. At that time TCA will have about 15 turboprop planes and will be operating them on all of its routes to the U. S. (except the Vancouver-Seattle run) and on many flights in eastern and central Canada.

• **Before the TCA Viscount** program gets into full swing, however, Capital Airlines will have started operations with the aircraft. First of the initial three Capital planes due to be delivered this spring probably will be handed over to the airline in England before the end of this month. Latest word is that the Civil Aeronautics Administration's certification program will take place in the United Kingdom so that when the aircraft finally arrives it will be ready to enter scheduled service.

Indications at press time were that the first Capital Viscount would arrive in Washington some time in May and that scheduled operations would get under way around the beginning of June. At first, Capital will use the turboprop aircraft on flights from Washington to Chicago and Norfolk but when all three of the initial batch are available for service, several more of Capital's major cities will be included in the Viscount schedules. As the main portion of the Viscount delivery program to Capital (involving the balance of the 60 aircraft ordered) progresses, starting in the fall, the British planes will take the place of the airline's Constellations, DC-4s and DC-3s on more and more routes. By next spring, every key city on the Capital network will be receiving Viscount service.

• **The third fleet** of Viscounts to serve the U. S. this summer will be the aircraft of British West Indian Airways. The airline's first Viscount route will be Trinidad-Barbados-San Juan-Bermuda. At Bermuda, the aircraft will be chartered to BOAC for a roundtrip to New York. Scheduled flying time between Bermuda and New York will be 3 hours 15 minutes westbound and 2 hours 55 minutes westbound. The BOAC Viscount flights will be operated as first-class "Monarch" services accommodating no more than 44 passengers. When operated on BWIA flights,

TCA'S VISCOUNT INTERIOR (left) features 40 two-abreast seats.
CAPITAL'S VISCOUNTS (right) will accommodate 48 in two-abreast seating.



the Viscounts will be tourist-class aircraft with accommodations for up to 53 passengers.

BWIA's second Viscount route will link Miami with Jamaica; one of the three weekly flights will call at Grand Cayman. The third route will connect Jamaica with Trinidad via Caracas and thus will provide the first turboprop aircraft service to South America. Other routes scheduled to be operated with BWIA Viscounts this year include Trinidad-Georgetown and Miami-Nassau.

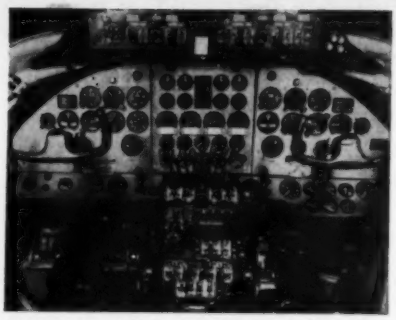
• **The Viscount** has come into service in the U. S. without getting the preferential treatment on airways and at airports that it receives in Europe. At most European airports, instead of loading up, starting and taxiing out to wait its turn for clearance at the end of the runway, the Viscount loads up but does not start its engines until getting a signal from the tower that its turn is coming up. Five minutes before takeoff the pilot is told to start his engines and he then taxies directly to the position for takeoff.

Herbert O. Fisher, Director of Aviation Development for the Port of New York Authority, told AMERICAN AVIATION prior to the inauguration of TCA's Viscount service into Idlewild that standard procedures would be used unless actual operational experience proved it impractical. He said that he understood that Viscounts can hold at the end of the runway for up to 20 minutes without difficulty; if the "hold" would be longer, the aircraft would delay at the ramp until clearance was possible, the official said.

• **The high idling** fuel consumption of the Viscount's four Darts nevertheless makes its preferable for the aircraft to delay starting up until take-off clearance has been received or is imminent, Henry S. Weigel, a Capital pilot, told the Air Line Pilots Association safety forum in Chicago last month. He admitted, however, that "it might be quite difficult to convince our fellow pilots that we have been delaying our start in order to conserve fuel and had called for clearance before we taxied out."

Weigel said that if a prolonged holding for landing clearance is necessary, Capital naturally will want to hold at the highest possible altitude but observed that it is likely to be "quite a trick" to maintain landing sequence at high-density airports in this way.

Discussing Viscount landing procedures, Thomas E. Rigdon, CAA airways operation specialist, said that the CAA Office of Airways "firmly believes" that Viscounts can be treated on an equal basis with other types of air raft. He said that if a landing delay



"AMERICANIZED" COCKPIT of the TCA Viscount is neatly arranged. There is space on the quadrant for installation of an autopilot.

is encountered, it might be necessary for the turboprop aircraft to hold a higher altitude, but he foresaw no need for special procedures at this time.

Rigdon admitted that, if necessary, a penetration approach could be adopted but he labeled this as being "most unsatisfactory."

• **Passengers on the first** Viscount flight out of New York—a press flight up the Hudson—were impressed by the aircraft's short stay at the end of the runway prior to take-off (there is no magneto check) and short run. In the air, the lack of vibration came up to billing and the noise level was impressively low—lower, in fact, than in British European Airways' Viscounts, due to the use of more soundproofing in the TCA version.

The TCA cabin interior is spacious, with only 40 seats arranged two-abreast (in European Viscounts 47 seats are used in two- and three-abreast configurations). The 20 elliptical windows, each 26 inches high and 19 inches wide, make the cabin much lighter than in most aircraft and provide better visibility for passengers.

Only complaint heard from the members of the press flight concerned the smell of turbine fuel in the cabin when the engines were started. All other comments were all highly favorable. If first impressions prove correct, the Viscount is going to make a formidable transport in the U.S. airline industry.

• • •

Convair Quiets Passenger Cabin

The basic rule of thumb that highly-powered twin-engine airline transports are the noisiest type and nothing can be done about it has met its exception.

After months of research, Convair Division of General Dynamics Corp. has disclosed new developments that will give its Model 340 Convair-Liner the "quietest passenger cabin" of any modern U. S. transport."

Backing this flat claim, Convair sales and contracts director J. G. Zeverly says the improvements represent an advance in the state of the art not previously available to industry.

The sound modification, destined to go in all future 340s and to be made available in kit form for present operators, includes these changes:

• **Exhaust Silencing**—A new single rectangular exhaust at the aft end of each nacelle replaces the two circular augmentor outlets.

• **Added Insulation**—Another layer of soundproofing is provided in critical cabin areas. Special acoustical tape will be applied to some inner surfaces of the cabin dural plating.

• **Double Windows**—First eight rows of seats will be fitted with inner window units.

This final list of improvements was arrived at by Convair aided by the acoustical consulting firm of Bold, Beranek and Newman, Inc. The Cambridge, Mass. consultants were retained to study the 340 noise problem and come up with specific designs to cut cabin sound level.

The complete soundproofing program, including silencers, is estimated to weigh about 900 lbs. However, a parallel speed improvement program under way at Convair is aimed at offsetting this penalty with a gross weight hike, resulting in no loss in payload to the operator.

CAA certification tests on both the sound and speed changes are now getting under way and are expected to last about three months. Until these tests begin, Convair officials aren't making any firm estimates of increased speed. However, they indicate they can guarantee at least 5 mph now and expect eventually to reach 8 to 10 mph.

Among the many unusual design features of Lockheed's YC-130 turbo-prop transport for personnel or cargo, is the Menasco-built landing gear, arranged in tandem to facilitate operation of this airplane from small fields or rough forward airstrips.

Menasco was first to deliver complete aircraft landing gear utilizing high heat treat steels with ultimate tensile strengths from 260,000-280,000 PSI, and 20% saving in critical weight. Comprehensive research by Menasco into *all* aspects of high heat treat was necessary for the production of the landing gear for the new Lockheed YC-130, an airplane whose tremendous load-carrying capacity requires rugged performance of its landing gear. Pioneering accomplishments like this improvement of existing basic materials is one of the reasons why leading aircraft designers constantly look to Menasco Manufacturing Company for advanced ideas, originality of design and progressive techniques in the production of better landing gear.

menasco manufacturing company

Specialists in Aircraft Landing Gear

805 SOUTH SAN FERNANDO BOULEVARD, BURBANK

First in DEVELOPMENT, QUALITY, DELIVERY & SERVICE

Circle No. 27 on Reader Service Card.

Oklahoma City Proposes Civil-Military Cargo Terminal

Envisioning "a future of tremendous proportions" in the air cargo field, the Oklahoma City Chamber of Commerce has undertaken some constructive planning, in an outstanding example of civic foresight. It has proposed the establishment of combined civil-military air cargo terminal facilities on Will Rogers Field, and the city already has begun acquisition of some 5,000 acres between the municipal airport and Tinker Air Force Base.

The combined facilities would be designed to serve both the military airlift and commercial air cargo needs. The military phase, the Chamber points out, would be designed particularly to serve civil air cargo contractors to the military operations in the area and the civil phase would serve both scheduled and non-scheduled cargo carriers carrying civilian goods.

"Thus all civil air cargo carriers," officials stated, "whether contractors to the military for the movement of military cargo or carrying goods, may center at one point all of their terminal operations. This would include such facilities as loading and unloading, crew changes, maintenance, and other activities normal to their operations. The various military establishments would be relieved of the necessity of providing, individually, for such operations."

• **With space at a premium** at Tinker AFB, jet engine overhaul center, major advantages are seen in the establishment of off-base air cargo terminal facilities. Cargo carriers could originate and terminate their flights at the municipal airport, with freight easily trucked the 10 miles to Tinker. Thus the base would have only to provide warehouse points for loading and unloading of trucks for air freight moved by the civil air carriers, an operation required under any terminal arrangement, the Oklahoma City feels. It would be relieved of delivery and pickup at terminal docks, emergency maintenance, crew changes, etc.

These same advantages, it is believed, would apply with respect to service for other military installations in this area, Navy and Army as well as Air Force. The only difference would be in the distance involved in trucking operations.

• **The Chamber cites** as an example of the large tonnage of military air freight which may originate at Tinker the invitations to bid to the air carriers on movement of aircraft engines to many foreign points of AF operations. "Engines alone will produce a high monthly outbound tonnage, and backhaul of engines for overhaul will produce large inbound tonnage."

Further, the contemplated large-scale airlife of military personnel supplies and equipment by commercial air lift lends emphasis to the need for the terminal on Will Rogers Field to provide adequate docks, aprons, aircraft and truck loading facilities and freight handling equipment.

Recognizing "the growing need for such an operation for the strictly commercial elements involved," the Chamber feels that the proposed terminal would be "advantageous to all." The present and proposed highway system connecting Will Rogers Field with all points is used as another example of the advantage of the site.

• **The Chamber concluded** in its proposal that "Oklahoma City is already firmly established as one of the major wholesale distribution points of the Southwest . . . We believe that air cargo is in its infancy and that the establishment of modern terminal facilities, capable of expansion with need, will be a major economic advantage in the future.

"This proposal is made with the conviction that civil air freight carriers serving the military operations in this area can, with provision for their accommodation, operate to and from Will Rogers Field as the terminal point, with material advantage to the military bases they serve with great encouragement to the establishment of large air cargo terminal facilities here which would serve all air cargo users." • • •

Court Sets Hearing Date On Collision Pilots

The U.S. Court of Appeals, District Circuit, has tentatively set April 13 as the opening for oral arguments on Civil Aeronautics Administrator Fred B. Lee's appeal of a Civil Aeronautics Board decision granting immunity to United Air Line pilots Lewis H. Brubaker and Charles E. Olson in the UAL-American Convair collision in 1953.

CAA contends that accident investigations are civil in nature, therefore not subject to Fifth Amendment rights, and wants the court to grant them the right to suspend the pilots' licenses. In its reply brief, CAB contends that:

• The Administrator has no legal standing to appeal a CAB decision because he "is not a 'person' within the meaning of the statutory review provision . . . has no interest in the Board's order sufficient to permit review . . . His function is merely that of a prosecutor . . ."

• "The Board's order is correct. The Administrator seeks a suspension of the pilots' licenses solely on the grounds of alleged violations of the Civil Air Regulations, and to impress upon them and others the necessity for observance of the Regulations . . . This marks the suspensions as punitive in the legal sense . . ." thus enabling Fifth Amendment rights.

ARMY HAS TAKEN DELIVERY on its first Sikorsky H-34 (S-58) helicopter, which is capable of carrying 12 to 14 fully equipped troops or 3,000 lbs. The H-34 has a four-bladed single main rotor and is powered by a Lycoming-built Wright R-1820 piston engine of 1,425 hp. Army has ordered "a large number" of the big copter transports.

MEN and IDEAS

"I'D LIKE TO SEE this airline derive about 27% of its revenue from passengers, 3% from freight and 25% from mail pay. We won't reach it this year or next, but we'll work toward it."

In 1949, when he made this statement, Robert English Peach, then 29 and executive vice president and operating head of Robinson Airlines, had little idea when it might become a reality. The airline (its name was changed to Mohawk in 1952) had been certificated only a year and load factor was 33.3%. About half of its revenue was mail pay and subsidy.

Yet in 1954, only five years later, Mohawk's division of revenue was: passengers, 72.3%; freight and express, 2.2%; mail pay and subsidy, 23.3%; non-scheduled and incidental, 2.2%.

Seated in his office at Cornell University Airport, Ithaca, N. Y., Bob Peach, now 35 and president and director of one of the more successful local service lines, ventures a prediction he thinks will be as accurate as the one made in 1949: "With some larger airplanes, we'll be completely free of subsidy in 1961. Possibly by 1960, but certainly by 1961." Fellow workers, who have seen his other long-range predictions become reality, don't expect him to miss on this one. Why larger airplanes? To decrease subsidy, revenue from sources other than mail must be increased, Peach points out. Such increase isn't possible with the DC-3.

• **More than any other person,** Peach has been the driving force behind Mohawk's rapid rise. "He dishes out six times more work than you can handle on the theory that you'll accomplish three times more than average," says one old-timer. However, he's harder on himself than on anyone else. This winter, usually working a seven-day week, he brought himself close to a physical breakdown.

All 10 years of his business life have been spent with Mohawk, starting as a pilot in 1945 when the then-uncertificated company was flying a single-engine Fairchild off a small lakefront strip at Ithaca. (Two other top Mohawk officials also started as pilots—Carl Benscoter, vice president-operations, and John Carver, vice president-secretary.)

Born near Syracuse, N. Y., on Mar. 9, 1920, Peach graduated from Hamilton College (9th in a class of 100) in 1941, majoring in economics and political science. Prior to graduation, he served as assistant to the president of Hamilton. He learned to fly in the Civilian Pilot Training Program.

In October 1941, he accepted a fellowship at University of Chicago Law School, but two months later joined the Navy, just three days after Pearl Harbor. As pilot and plane commander in the Pacific theater, he won two Distinguished Flying Crosses and five Air Medals.

On Oct. 1, 1945, two months after being relieved from active duty, he entered Cornell University Law School at Ithaca and at the same time joined Robinson as a pilot. He continued in law school several months while flying 85 hours monthly. "I went to school mornings and flew afternoons and on weekends," he says.

However, in June he gave up ideas of finishing law school and accepted an opportunity to organize Robinson's traffic and sales department. After a year and a half as traffic manager, he was named acting general manager and a director. Following certification of Robinson in February 1948, he participated in refinancing of the company and was elected executive vice president and general manager in a reorganization. Since February 1954 he has been president.

During 10 years with Mohawk, he has developed strong convictions toward his airline. He claims that by anyone's standards Mohawk is entitled to a permanent certificate. "As things stand now, we're not even on the same basis as the sorriest trunkline that has a permanent certificate. I want the right to be on the same basis as American Airlines, I think we've earned that right."

Despite his felings on this subject, he's keeping first things first: He put strengthening of routes and obtaining a flat mail rate (without mileage limitation) ahead of permanent certification.

Mohawk now is entering what might be called the second phase of its history.

Phase 1 saw substantial progress in the building of service, in getting operating costs into line and in reducing government subsidy to a point that company officials feel is almost the lowest level possible with prewar aircraft.

Phase 2, dating from Apr. 2, 1955, starts with the addition of three postwar aircraft to the present fleet of 10 DC-3s and a drive to eliminate subsidy completely by 1961.

• **In its first 10 years,** Mohawk grew from a small

ENTER NOW! THE MOST EXCITING CONTEST IN HISTORY

TO CELEBRATE 30 YEARS OF AIRLINE SERVICE!

TWA's $100,000 COSMIC CONTEST

$50,000 NOW... $50,000 IN 1985

It's easy! It's fun! It's actually two contests in one. You can enter one or both parts . . . win both first prizes for a grand total of $80,000. And you can start right away because the entry blank to Part 1 is on the opposite page!

There's never been such a contest before! Just think what you could do with one of the big cash awards! Why you could pay off the mortgage, send the children to college, and still have plenty of money left over for travel to all those enchanting lands you've always dreamed of seeing some day. What's more, you may even win the big $50,000 cash prize in 1985 by entering Part 2 of TWA's Cosmic Contest!

So get busy this minute. Think of all the wonderful things you like about traveling by airplane, and why TWA is the way to fly. Read the tips on how to win both parts of this exciting contest printed on this page. Then fill in the official entry blank for Part 1 in this advertisement and mail it promptly. In a few days, you'll receive your official entry blank for Part 2, and another chance to win even more money!

30 CHANCES TO WIN RIGHT NOW!

1st PRIZE	$30,000
2nd PRIZE	5,000
3rd & 4th PRIZES	2,000
5th through 10th PRIZES	1,000
11th through 30th PRIZES	250
	$50,000

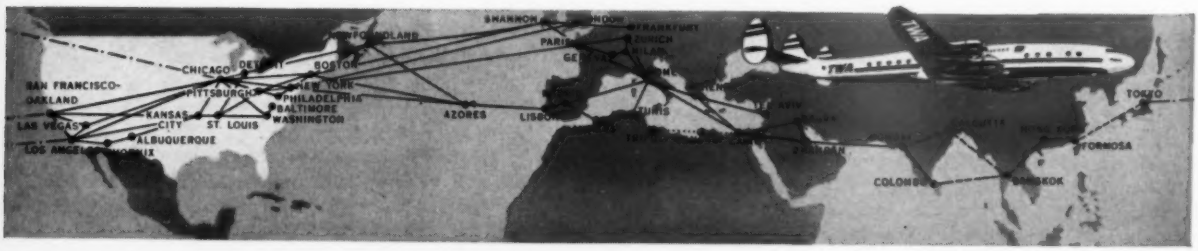
Here's all you do. Just complete the following statement in 30 additional words or less: "Flying is the way to travel, and TWA is the way to fly because_____."

Winners will be announced on or before September 30, 1955!

$50,000 IN CASH!

To be awarded 30 years from now in 1985!

Here's how to enter Part 2 of TWA's Cosmic Contest. When you send us your entry for Part 1, we will send you a special entry for Part 2. On this form write in 200 words or less what you think commercial air travel will be like thirty years from now! Your entry will be microfilmed and sealed in a special vault at TWA's new maintenance base in Kansas City, Mo. Then, in 1935, a selected board of judges will examine the entries and pick the winner.



TIPS ON HOW TO WIN PART 1

Simply think of all the many reasons why you'd like to travel by world-proved TWA. You'll find it easy to list advantages, such as speed, comfort, dependability, convenience, ideal schedules, worldwide routes. And to help you, here are just a few things you might say about TWA's many contributions to air travel:

TWA has put a two-week vacation in Europe within reach of millions more Americans by pioneering low-cost Sky Tourist service and developing a simple "Time Payment Plan" for travel anywhere.

Through its active support of the American creed of free enterprise and competition, more people than ever are now able to enjoy all the advantages of air travel.

TWA's voluntary assistance to countries of the free world in helping to organize their own efficient airlines has helped promote friendship between the U. S. and other nations.

TWA's swift, dependable service between 80 key cities on 4 continents has stimulated world trade and friendship.

TWA's leadership in efficient, economical operation has shown the way toward elimination of costly government subsidies with great savings to taxpayers.

TWA's leadership in mechanical and technical advances, its great fleet of Constellation aircraft and its skilled, courteous personnel have set new standards of speed, comfort and dependability in air travel.

TIPS ON HOW TO WIN PART 2

Here's what some people think air travel will be like in 1985!

It's so much fun to imagine what flying will be like in 1985. Just read these answers. See how easy it is to predict things to come. Then write your own predictions on the official entry blank TWA will send you when your entry to Part 1 is received.

For example, a housewife may write: "In 1985, I think aviation will be like this: It will be possible to fly all the way from Los Angeles to London without stopping. It will take just 6 hours, and you'll fly in an airplane that looks like a flying saucer, with no wings or tail and a huge cabin that is divided into many private staterooms. There will be no runways at airports because these planes will take off straight up and land like helicopters. The average speed of these planes will be about 1000 miles an hour. They'll fly about 30 miles up in the stratosphere. These planes will use atomic power that will last indefinitely, and their engines will be made of materials that last for years and years without attention."

A businessman might say: "In 1985, I think commercial aviation will be like this: Planes will be powered by rockets using a new type of fuel. They will fly at altitudes of 50 to 100 miles above the earth at a speed of 2000 miles per hour. Because of this speed, special watches will be designed so passengers can keep up with the rapid change in time zones. These space planes will take off straight up in the air. They will land the same way, using a special device that counteracts the gravity pull of the earth. They will have a range of 25,000 miles, so they can fly non-stop anywhere in the world. These planes will carry as many as 500 passengers and will feature complete restaurant service, a movie theatre, soda fountain and a cocktail lounge.

OFFICIAL RULES FOR
TWA's COSMIC CONTEST

1. TWA's Cosmic Contest consists of two parts. You may enter either one or both parts. Entries for both parts of the contest must be postmarked on or before July 31, 1955, and received not later than August 31, 1955. To enter Part 1, simply complete this statement in 30 additional words or less, "Flying is the way to travel, and TWA is the way to fly because . . ." To enter Part 2, state in 200 words or less what you think commercial air travel will be like thirty years from now (1985). A sketch of the type of aircraft used then may also be submitted, but the complete entry must be held to space provided in the official entry blank.

2. You may submit as many entries as you wish, but in each case an official entry blank must be used. An official entry blank for Part 1 is printed in this advertisement. Entry blanks for Part 2 will be mailed to you when your entry to Part 1 is received. Additional entry blanks for both Part 1 and Part 2 may be obtained at TWA ticket offices, on board TWA planes and in most authorized travel agencies; or by writing to TWA, P. O. Box 85, N. Y. 46, N. Y.

3. Contest is open to everyone except employees of Advertising Distributors of America, Inc., TWA or its advertising agencies and members of their immediate households and families.

4. Prizes listed on entry blank and in this advertisement will be awarded on the basis of sincerity, aptness and originality. Literary skill is of secondary importance. Neatness will count. Entries to Part 1 will be judged by Advertising Distributors of America, Inc. Winners will be announced on or before September 30, 1955, and names of winners may be obtained by written request to the address above, enclosing a stamped, self-addressed envelope. Entries to Part 2 will be microfilmed and stored in a vault in Kansas City, Mo. The chief executive officer of TWA will name the independent judges of Part 2 on or before January 1, 1985, and the winner will be announced before July 1, 1985. In the event the contestant submitting the winning entry to Part 2 is not living on the date the winning entry is announced, the prize money to Part 2 will be paid to the person authorized by the last will and testament of that contestant or otherwise authorized in law to receive such payment, or to the legal representative of the estate of that contestant. Judges' decisions are final; duplicate prizes in case of ties.

5. Entries must be the original work of contestants and submitted in their own names. All members of a family may enter, but only one prize for Part 1 will be awarded to a family. Contest is subject to all governmental regulations and causes and conditions beyond TWA's control. All entries become the property of TWA, and submission of entries to one or both parts of the contest gives TWA full rights to reproduce, publish and use such entries as TWA sees fit at any time.

TWA 30 Years of Service 1955 U.S.A. · EUROPE · AFRICA · ASIA

Fly the finest . . . **FLY TWA**

TRANS WORLD AIRLINES

U.S.A. · EUROPE · AFRICA · ASIA

OFFICIAL ENTRY BLANK PART 1

TWA's COSMIC CONTEST

$50,000 IN CASH AWARDS NOW!

TWA's Cosmic Contest
P. O. Box 85
New York 46, N. Y., U. S. A.

Dear Sirs: Here is my completed entry blank for Part 1 of TWA's Cosmic Contest. I understand you will send me an official entry blank for Part 2 when you receive this entry.

Flying is the way to travel, and TWA is the way to fly because:

(Complete in 30 additional words or less)

_____

_____

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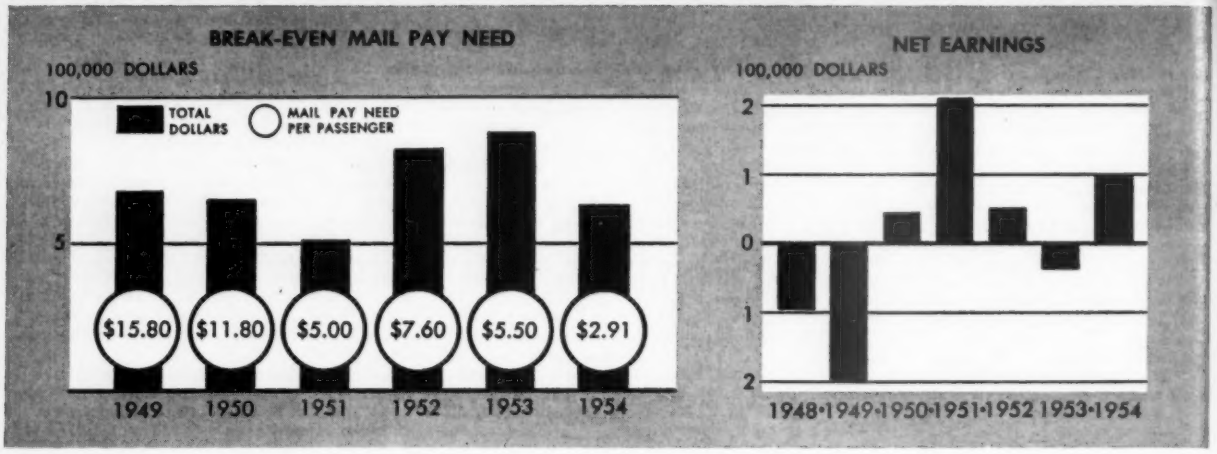
*Name*_____

*Address*_____

*City*_____ *State*_____

*Country*_____



uncertificated line operating between Ithaca, N. Y., and Teterboro, N. J., to a local service system covering 1,152 route-miles in New York, New Jersey, Massachusetts and New Hampshire. Equipmentwise, it has progressed from one single-engine Fairchild through two twin-engine Cessnas, four twin-engine Beechcrafts, to 10 DC-3s (an 11th DC-3 is under contract to General Electric for flight-testing electronic equipment). Three Convair 240s are to be added soon.

In 1954 the company took in 93.5¢ per mile commercial revenue (including service mail pay but not subsidy) with its DC-3s. The remainder of the 120.3¢ revenue, or 26.8¢, was subsidy. The 1954 profit was $161,000 against a 1953 loss of $35,000.

Last year 218,169 passengers were carried on scheduled fiights (plus 3,979 on charters), a 36.4% gain over 1953, while revenue passenger-miles rose 44.4% to 39,179,154. Passenger load factor was 54.38%. In comparison, 1949 totals were only 43,000 passengers and 6 million passenger-miles.

• **This rapid rate of growth,** plus convictions that (1) the territory served has an even much greater traffic potential, and (2) larger equipment is a "must" in any program to eliminate subsidy, resulted in management's decision to buy Convairs.

Squeezing more than 93.5¢ commercial revenue out of a DC-3 fleet would be a tough job, management feels. The plane's seating capacity now has been increased to 28 (at a cost of $8,000 per plane), and there is no further room for expansion.

Here is an example of the traffic volume Mohawk has been carrying to produce 93.5¢: in a six-day period in January, all 28 seats were occupied on segments of 28 flights; 27 seats were taken on 15 flights; and 26 on 16 flights. During the month of January, 28 seats were occupied on 70 occasions.

Mohawk took the drastic step of reducing scheduled mileage by 20% last fall, compared with a normal seasonal cut of 10-15%. As a result, it made money in months that never before had shown a profit. However, the cut was made at the expense of good service; it was made to show better earnings and to accumulate cash for new planes.

The company could continue, perhaps for a year, under such curtailment. But it also would continue to turn people away. "Your operation would go downhill, and I'd hate to be responsible for the company in the following year," says Peach. Therefore Mohawk is reversing itself and adding mileage, now scheduling 224,000 miles monthly.

In 1954, $634,458 subsidy was needed to break even, a creditable decrease from the $881,829 of 1953. This year, for a DC-3 operation, the figure probably would be about $550,000, and by pushing things to the limit it could drop possibly to $450,000 in two or three years. But there it would stop.

To pay for the Convairs, a financing progam has been undertaken that includes new equity capital (almost all subscribed by present stockholders) and a loan from Chase National Bank, part of which will be used to retire present debt.

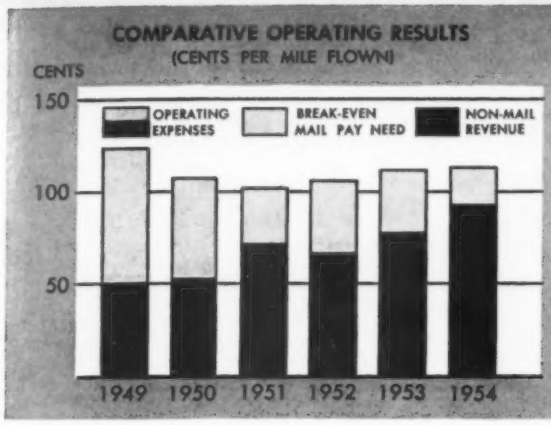
It is estimated that such a mixed-fleet operation (no DC-3s will be sold) will cost the government more in subsidy during the first year and about the same in the second, but federal aid will then start to decrease—disappearing in 1961.

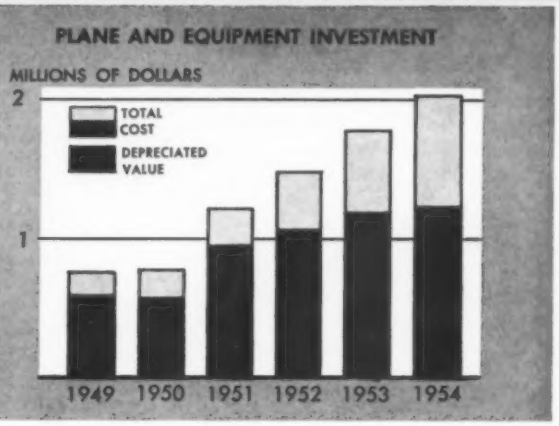
• **Mohawk is aiming** toward a 20% traffic gain this year, and Thomas J. Kirkup, recently named general traffic-sales manager, believes the passenger total can reach 275,000. Kirkup, a newcomer in the industry (10 years in Firestone Tire & Rubber's sales department, later president of an Ithaca automobile agency), is out to improve both sales and service.

Looking for new sources of revenue, for example, he points out that only 10% of Mohawk's passengers are women, and he is searching for ways to increase the percentage. Charter business—$48,760 revenue last year—also will increase when Convairs relieve the equipment situation. Several college and professional athletic teams have been carried, and the demand is increasing.

To brush up service to the cus-

ONE OF MOHAWKS familiar DC-3's.





tomer, Mohawk has started a station training program under which all personnel are brought to headquarters in shifts, once yearly. Stress is placed on courtesy and the furnishing of accurate information to the customer (all passenger complaints received at headquarters are now placed in a binder and circulated systemwide; each agent must read and initial.)

The training program, costing $3,500 yearly, not including officials' time, also has helped reduce personnel turnover to below the industry average, according to Russell Stephenson, personnel director.

Mohawk now has 346 employes, of whom 80 have been on the payroll five years or longer, and will probably add 50 this summer.

• **In operations and maintenance,** under Carl Benscoter, vice president-operations, costs are showing the results of rigid controls. A "budget" system in maintenance has reduced costs from an average of $30 per total flight hour (direct maintenance plus ground and indirect) in the year ended June 1954 to $28.55 in the year ended last December. The figure allowed by CAB in mail rate cases is $30.

Under the system, the airline first determines how much of the "product" (airplane miles) is to be "manufactured" for a certain period. Then, after calculating the number of hours to be flown, a pre-hour budget figure is determined ($29 is being used). Total hours then are multiplied by $29. From the total, a percentage based on past experience will be used for materials. The remainder is available to spend for labor.

Mohawk's "phase" overhaul plan also has clicked. Rather than removing a plane from service for six weeks for an 11,000-hour overhaul, work is done in eight phases—cockpit at one time, cabin interior at another, etc. Each phase takes four and one-half days. Result is full fleet availability during weekend peaks. Mohawk had all 10 planes in service 151 days during 1954. Utilization now is 6.02 revenue-hours daily.

Engine performance has shown marked improvement (overhaul is done by Dallas Airmotive, Dallas, Tex.). In 1953, 50% of the Wright R-1820-G202As were flown to allowable overhaul time; in 1954, 76%. Total engine hours last year were 46,306, against 38,818 in 1953, while engine removals remained the same (42). Cylinder changes dropped from 62 to 47. Installation of nichrome valves reduced cylinder removals for valve trouble from 49 to 29; average engine hours per cylinder change jumped from 625 to 980.

Standardization of radio equipment and radio installation in airplanes paid off. Radio delays in 1954 were 35, against 84 in 1953.

Why did Mohawk buy Convairs instead of waiting for a possible new DC-3 replacement? Principal reason was that Convairs were available immediately and the company felt it could not wait longer for larger equipment. Also, Mohawk's management is convinced that a local service line can't afford to go through a period of removing "bugs" from a new plane.

Peach, who was a member of the local lines' committee on a DC-3 replacement, doubts the industry will be able to agree on what it wants.

The Convairs were bought from C.A.T., S.A., a Panamanian corporation which took them over from Civil Air Transport, Gen. Claire Chennault's company, now based on Formosa.

• **Despite its money-losing** helicopter experience last summer, Mohawk still is enthusiastic about rotary-wing aircraft. It operated its eight-passenger Sikorsky S-55 between Newark and Liberty/Monticello, N. Y., three months without federal aid. Failure to carry many passengers boiled down to a matter of economics. High operating cost—$1.56 a mile direct cost—necessitated a fare of almost 20¢ a mile, against 6.8¢ on DC-3s. When this was later dropped to 15.6¢, traffic increased, but not enough. Lack of a downtown New York heliport also was a deterrent.

However, management believes a larger, more economical helicopter with turbine power probably is the eventual answer, but that it is at least "another round of conventional airplanes away." Says Peach: "We learned all we wanted to know from last summer's operation." The S-55, not now in use, probably will be sold.

• **As the second phase** of its history opens, and as part of its drive to eliminate subsidy, Mohawk will concentrate on:

• Further strengthening of its routes.

• Establishment of a flat mail rate.

• Obtaining a permanent certificate.

"In general, CAB has given us a good route structure," Peach asserts. "We have strong terminals—Boston, Buffalo and Newark—and small intermediates. The strengthening we need involves extensions to Cleveland and to Detroit and/or Toronto."

For carrying mail, Peach wants to contract with the government on the basis of a fixed rate sufficient to produce, for example, an 8% profit. There would be no mileage limitation. If the rate produced more than 8%, Mohawk would return 50% of the excess to the government and keep the rest.

In return for this arrangement, it would sacrifice the protection of a mileage limitation. Under such a limit, mileage in excess of the carrier's daily base is not only compensated for but acts to reduce mail pay which would have been realized. Thus, by staying under the limit, a carrier receives more mail pay but develops less commercial revenue.

Last year Mohawk consistently exceeded its CAB set base mileage. • • •

PROCUREMENT NOTES

THE NEW REGULATIONS for Part 4, Section III, ASPR, for the types and conditions of contracts are now being printed. They are substantially the same as when submitted to industry for comment. Biggest disappointment to industry is the retention of the delayed profit formula of incentive-type contracts.

• •

CHAIRMAN BONNER of the House Merchant Marine Committee, which legislates for the Coast Guard, was surprised when he was told the House Appropriation Bill contained a limitation of 126 aircraft for CG. Twenty-nine of these will be helicopters. An effort to remove this limitation will be made in the Senate.

• •

NICKEL, COPPER, ALUMINUM and some alloy steels are in short supply. Releases from the national stockpile have been made to many firms. Orders to conserve these metals are being rigidly carried out by the services. Navy has been active by switching from nickel bearing to chromium stainless steel.

• •

ENTHUSIASM for passing retroactive legislation for the extension of the Renegotiation Act has been dimmed with the collapse of the stock market probe. Trade groups were caught off guard by the President's approval of such legislation. Industry is hopeful that any law passed will contain modifying amendments. One suggestion is to increase exemptions to one million dollars of annual business, another is to permit as allowable costs all expenses that are deductible for tax purposes in the Internal Revenue Code.

• •

PLANS are well under way for the reorganization of MATS to increase efficiency and reduce costs. A number of reports are being studied. One shows a total of 5,420 military transport planes and only 887 assigned to MATS. They have a bare 200 out of 530 C-54s. One report suggests a pool of all such planes be handled by MATS for temporary assignment to other branches as needs develop. Pentagon fiscal officers expect a new accounting system known as industrial funding to be installed.

• •

GEORGE WASHINGTON UNIVERSITY is holding a seminar April 15 and 16 in the Lisner Auditorium, Washington, on the problems arising from the terminations of military contracts. T. Alfred Pilsen, chief of the purchasing and contractual policy committee at the Pentagon, and Prof. Robert pasley of Harvard are among those who will discuss the history, the legal aspects and needed changes for these regulations.

• •

Pending CAB Cases

Hearings in the **Domestic Trunklines Service Mail Rate Case** opened in Washington March 28, as CAB refused the airlines' request for further time to work out a settlement. Hearings and other steps are expected to run several years, although airlines, CAB, and Post Office, were mildly optimistic that a settlement can still be reached.

A final CAB decision in the **States-Alaska Case** was scheduled to go over to the White House about April 1.

CAB's enforcement case against the **Great Lakes Airlines-Skycoach** group is running into more court action than any previous case. Respondents have challenged all attempts of CAB to enforce subpoenas and have forced the Board to back up subpoenas with court orders. Hearings, which started in Washington in early January, still are in progress on the West Coast.

Recent CAB Decisions

North Central Airlines granted exemption to operate between both Detroit airports—Willow Run and City Airport.

Northwest Airlines granted one-year exemption to transport persons, property and mail between Cold Bay, Alaska and Tokyo on NWA's U.S.-Tokyo route.

Linea Aeropostal Venezolana foreign permit amended to transfer Havana from Maiquetia-New York route to Maiquetia-Miami segment, and to add Dominican Republic to Maiquetia-New York route.

CAB Applications

North American Airlines filed proposal for settlement of pending enforcement case offering to surrender letters of registration in exchange for authority to operate pending disposition of certificate applications.

National Airlines claimed Eastern Air Lines still "illegally controls" Colonial Airlines and urged CAB to override an examiner's recommendation that the control investigation be dismissed.

Trans World Airlines and Pan American World Airways filed petitions for reconsideration of CAB decisions in the recent Transpacific and West Coast-Hawaii Cases.

CAB Calendar

Apr. 12—Oral argument, Northwest Airlines Kalispell Service Case. Wash., D. C. Docket 4775.

Apr. 18—Hearing, Air Freight Renewal Case (east-west carriers). Tentative. Docket 4770 et al.

Apr. 19—Oral argument, Air Taxi Operators. Wash., D. C. Draft Release 71.

Apr. 26—Hearing, Helicopter Air Service Renewal Case. Wash., D. C. Docket 6600 et al.

Apr. 26—Oral argument, States-Alaska Fare Case. Wash., D. C. Docket 6328 et al.

May 24—Hearing, Surface-Mail-By-Air Investigation. Wash., D. C. Docket 6881.

It's Coming...

Circle No. 28 on Reader Service Card.

TWA Loans 11 Pilots To Deutsche Lufthansa

Eleven Trans World Airlines pilots, all captains, will be loaned to Deutsche Lufthansa to conduct a training program and help with new German carrier's transatlantic operations.

The pilots will switch over to the German airline in June and will command Lufthansa's Lockheed 1049G Super Constellations on the Hamburg-Duesseldorf, Frankfort, Shannon-New York service.

TWA also will ferry the German airline's first four Super Connies from Burbank, Calif., to Hamburg.

International Aviation

By Anthony Vandyk

THIS SUMMER the London-Paris route is going to be the scene of one of the biggest battles in airline history. Ever since the war, the flights of Air France and British European Airways between the two capitals have departed at different times: BEA's services have operated on the basis of "every hour on the hour" from London and "every hour on the half hour" from Paris; Air France's flights have left London "on the half hour" and Paris "on the hour." This summer, however, Air France has changed its departure times to duplicate those of its competitor.

To make the London-Paris competition even stiffer, Air France will operate every flight with Viscounts, while BEA will continue to use the high-wing piston-engine Ambassador Elizabethan. The French airline is scheduling 65 minutes for the 258-mile flight from London Airport to Orly, while the British carrier's timetable allows 80 minutes for the 238 miles between London Airport and its Paris terminal, Le Bourget.

The London-Paris route has always been an equipment battleground for airlines, although the winner has not always been the carrier with the fastest plane. For many years passengers preferred a 2¼-hour flight in the ambling but extremely comfortable Handley Page Heracles to the 1½-hour hop in the French three-engine Wibault. It was only when Air France introduced the DC-3-like Bloch 220 that customers began to desert the British company. They returned in 1939, however, when Imperial Airways introduced the Armstrong-Whitworth Ensign and the de Havilland Albatross on the Paris run; the latter did the trip in 1 hour 10 minutes, five minutes faster than the Bloch (and only five minutes slower than today's Viscount time!).

After the war, the competitive situation remained stable for several years with Air France flying four-engine Languedocs and BEA Vikings. When DC-4s took over from the Languedocs, the British company lost some of its customers, but got them back again when it introduced the Ambassador. The Viscount made its appearance on the London-Paris run a year ago when Air France used this equipment for its first-class midday "Epicurean" service.

As a postscript, it is interesting to note that BEA made a profit on its London-Paris operations in 1954. This probably is the first time that any carrier has not sustained a loss on the run, which as a classic airline route ranks with New York-Chicago, Sydney-Melbourne and Miami-Havana.

New IATA Atlantic Tariff in Prospect

AN OFF-SEASON FAMILY fare plan will be introduced on the North Atlantic routes on November 1, according to the recommendations of an International Air Transport Association meeting last month. The head of the family would pay full fare, but his wife and children (aged between 12 and 25) would benefit from a standard reduction of $150 first-class and $130 tourist-class for one-way travel; for roundtrips the reductions would be $300 and $200, respectively, per family member.

Also proposed for the North Atlantic is a slight increase in fares—the New York-London roundtrip fare would go up from $425 to $475, for example, and a narrowing of the differential between on-season and off-season fares.

* *

IN THE CARGO FIELD, several changes are to take effect on July 1 under compromise arrangements which prevented an open-rate situation coming about on the North and Central Atlantic. On that date a new commodity rating system will be introduced which will reduce the several thousands of existing special rates for specific types and quantities of commodities to less than 50, covering broad classifications of loads.

At the same time the present 30% discount for general shipments of 200 kilograms (440) lbs.) or more will be dropped in favor of other bulk discounts within the commodity rating system; the existing 25% discount for general cargo shipments of 45 kilograms or more will be retained. John Brancker, IATA's traffic director, explained that the new system is "essentially aimed to make cargo selling simpler, cargo service more attractive, and cargo rates cheaper for larger shipments of certain commodities." The new system is currently being worked out by the IATA Commodity Rates Board.

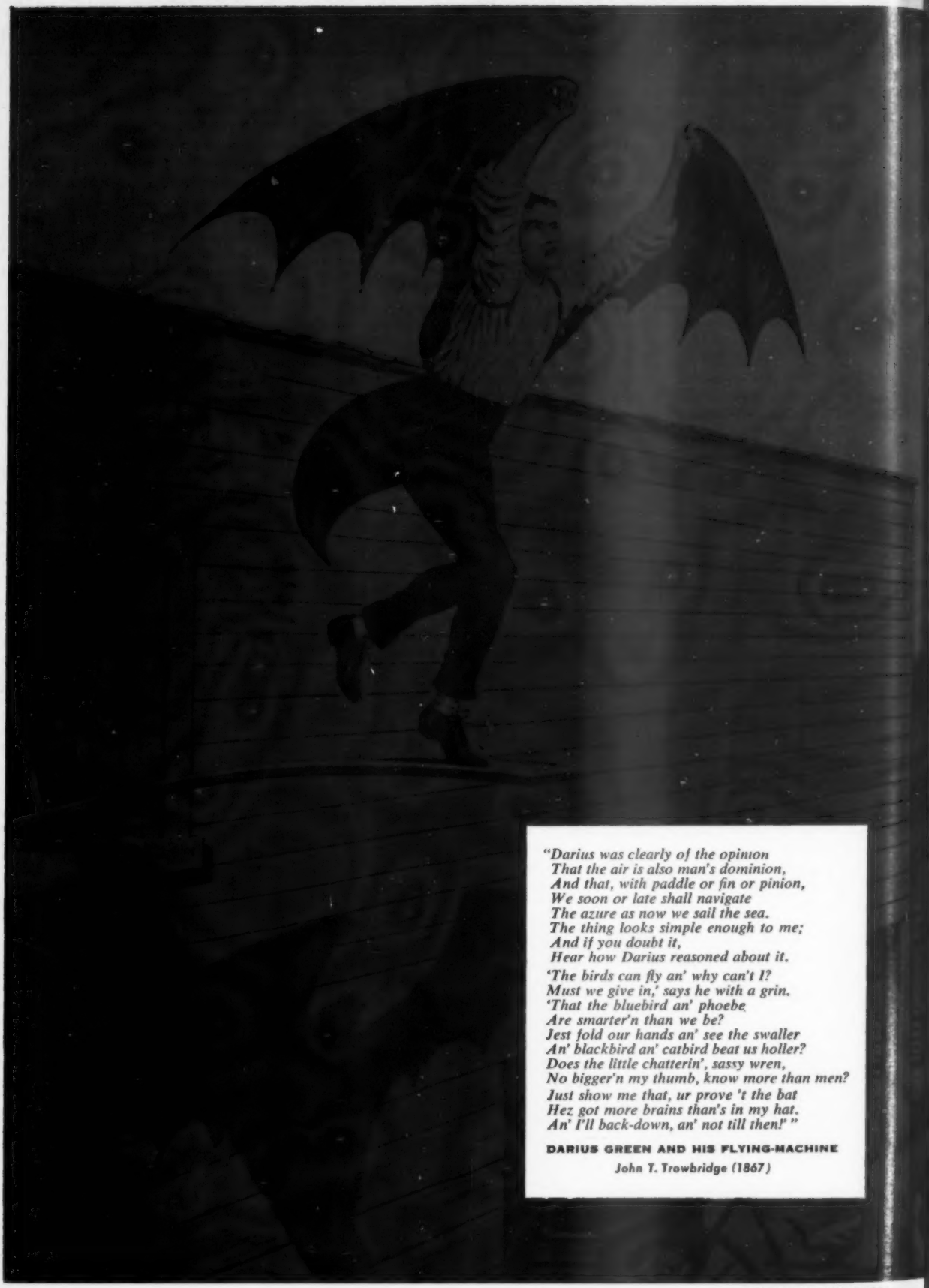
Military Briefs

The Royal Air Force's Bomber Command is to follow the pattern of the **USAF's** Strategic Air Command and occupy bases overseas as well as at home; hitherto it has been entirely U. K.-based . . . Britain's **Royal Naval Volunteer Reserve** air arm is to be re-equipped with Short Seamews, Fairey Gannets and Hawker Sea Hawks . . . **Jordan's** air force has received three Egyptian-built Bucker trainers . . . The **South African Air Force** has ordered Venom all-weather fighters from de Havilland and is to re-equip its transport division with "modern four-engine aircraft." . . . Marshal P. F. Zhigarev, commander of the **Soviet Air Force**, has been promoted to the newly-created rank of Chief Marshal . . . The **French Air Force** will get its first Republic F-84F fighters next month.

Manufacturing Briefs

de Havilland-Canada is to resume production of the Chipmunk trainer; the new series of aircraft will start coming off the line in July and will go to the RCAF . . .

BRITAIN'S LIGHTWEIGHT FIGHTER, the private-venture Folland Gnat has been ordered by the British. The order is for a "development batch" of the Bristol Orpheus-powered model (the prototype, illustrated above, is called the Midge and is powered by an Armstrong-Siddeley Viper).



"Darius was clearly of the opinion
That the air is also man's dominion,
And that, with paddle or fin or pinion,
We soon or late shall navigate
The azure as now we sail the sea.
The thing looks simple enough to me;
And if you doubt it,
Hear how Darius reasoned about it.

'The birds can fly an' why can't I?
Must we give in,' says he with a grin.
'That the bluebird an' phoebe
Are smarter'n than we be?
Jest fold our hands an' see the swaller
An' blackbird an' catbird beat us holler?
Does the little chatterin', sassy wren,
No bigger'n my thumb, know more than men?
Just show me that, ur prove 't the bat
Hez got more brains than's in my hat.
An' I'll back-down, an' not till then!' "

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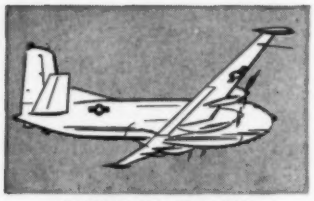
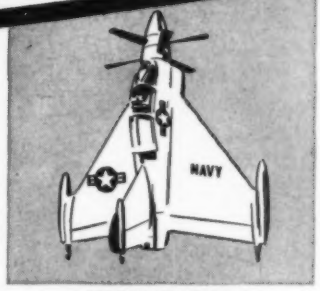


DOUGLAS YC-124B
long-range transport
for the U.S. Air Force



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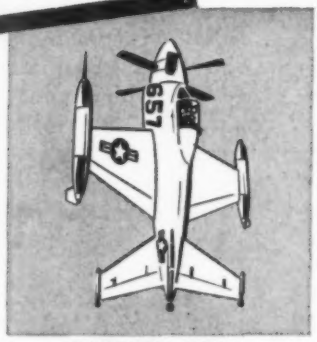
vertical take-off fighter
for the U.S. Navy



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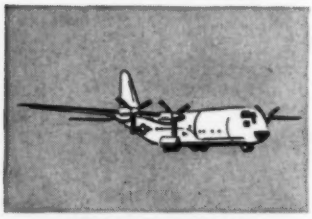
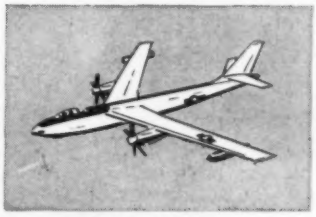


REPUBLIC XF-84H
USAF experimental Turbo-
prop fighter type aircraft

LOCKHEED YC-130
USAF high-performance
air freighter



BOEING XB-47D
long-range bomber
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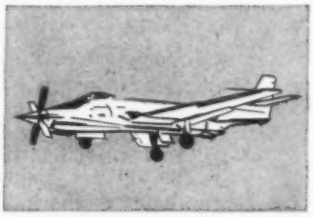

McDONNELL XF-88B
USAF experimental Turbo-
prop fighter type aircraft

Delivered in Quantity for
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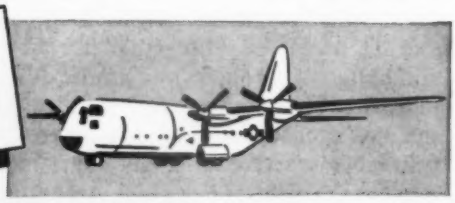

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EN ROUTE . . .

WAYNE W. PARRISH II

Jottings from my Notebook

ANYBODY with the right amount of dough in hand can buy a ticket at any one of four ticket counters at Washington National Airport and fly to Chicago in a couple of hours.

But I never go the shortest route if I have the time to seek out some new airports and scenery. A few Sundays ago I went to Chicago by way of the northern tip of Michigan, landed at three new airports, saw some good country and good people, and made a real enjoyable 10-hour excursion out of it.

I left on a Capital Connie at 9 a.m. for Detroit and connected there with a Capital DC-3 bound for the northland. It was a perfect cloudless winter day. First stop was Traverse City where I was met by Lee Husby, the station manager. Next was the airport serving Cheboygan, Pellston, Petoskey and Harbor Springs. Then we flew over Machinaw City and Machinac Island and the site of the longest bridge in the world now being built to connect the upper and lower portions of Michigan, and on to Sault Ste. Marie which is noted for the locks through which shipping operates in warm seasons between Lakes Huron and Superior. Everything was still frozen up there and lots of snow was on the ground.

The 20-minute turnaround was eventful. Ed A. Clark, district operations manager for Capital is also station manager for Trans-Canada. First thing he did was to introduce me to the station pet, a 2-year-old deer which the personnel found when a week old. The deer meets all planes, gets plenty of food from passengers, crew and station folks (he likes chewing gum among other things), and is very tame. So I had my photo taken with the deer and the Capital gang.

Clark has been at other Capital stations but likes the northland and won't trade the spot for any big city anywhere. In a way he's to be envied. If Capital tries to reach him from Washington he can teletype back that he's on a special assignment for TCA, and if TCA hollers for him from Montreal he can be busy for Capital. Meantime the fishing and hunting are awfully good up thataway. (I'm only kidding, Ed, if you get fired for this I'll take the blame, all you'll lose is the job.)

WWP and the Bentley

Found out two things at the Soo. One is that there's no airport on the Canadian side so TCA uses the U. S. airport but carries its passengers back and forth over the border in bonded limousines, thus avoiding a lot of international red tape. Only setup of its kind. Also, the first Viscount to land in the U. S. stopped at Sault Ste. Marie on a training flight. The boys up there are pretty proud of that "first."

It was hard to believe that only a few days earlier Capital arrived at the Soo on schedule but passengers couldn't get to the field because of a blinding blizzard. But the day after I was there another blizzard came through; spring comes late up there. Capt. Blackie Nygren likes the northern run though, so does Stewardess Lynn Johnston. Returning south we flew to Traverse City and then to Grand Rapids where Frank Clements, local manager, met me, and then to Chicago for an after-dark arrival. It was a fine day of flying.

I Join the Bentley Club

Some of you folks have been asking whatever happened to that car I bought in Paris last spring and drove through Spain. I can report that I had it shipped over to the U. S., with the help of my Scandinavian Airline friends, and it's in perfect running order in Washington.

I guess I have the only Bentley in the Capital. I read the other day that in 1954 there were 39 Bentleys and 33 Rolls-Royces sold in the U. S. for the whole year and at the price of new ones ($12,500 and up) I'm not surprised. The Bentley is made by Rolls and is identical to the small Rolls except for the front grill. Mine is a used 1950 model, natch.

I like it. It's the smoothest, most comfortable job I've ever driven. Although it's just a 6-cylinder car, the pickup is wonderful. It doesn't have any newfangled fluid drive, but it has a lot of other features of engineering, design and quality workmanship which more than make up for a few glamorous gimmicks and gadgets. Real leather, real nickel plating, inlaid wood paneling, a sliding panel in the roof for warm days, and a feeling of real strength. I wouldn't trade it for the finest Cadillac.

And just to show you that old Pappy Parrish wasn't caught out in the peat bog in a snowstorm, I've joined the Bentley Drivers Club, a worldwide organization with headquarters in England. Do you Plymouth owners belong to a club? Heaven forbid. But our Bentley Club has 1,212 members of which 44 are in the U. S. Every month I get a bulletin telling me when and where the boys are meeting.

For example, there was a meeting of Bentley drivers the other day at The Compasses at Pattiswick, near Coggeshall in Essex. And another at the Three Nuns Hotel, Cooper Bridge, Mirfield, Yorks. Or how about the gathering at the Red Lion at Cheam, Surrey, or at Bampton House Club, Heaton Moor, near Stockport, Surrey. I tell you good people, you just ain't living like us Bentley owners.

NORTHLAND FRIENDS: Carmena Raffaele, Louis Pesenski, WWP, Paul St. Pierre, Howard Matson, Ed Clark, Morris Heller and deer.

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Examiners Recommend Supplementary Status For Nonscheduled Lines

A new and tighter role for the nonscheduled airlines, although one with an apparent future, was recommended late last month by Civil Aeronautics Board Examiners Ralph L. Wiser and Richard A. Walsh.

Reporting their findings in the Large Irregular Air Carrier Investigation, the most extensive case in CAB's history, the examiners urged creation of a new classification of "Large Supplemental Air Carriers" which would entail five-year authorizations for selected carriers to engage in "supplemental charter and special services."

The examiners found CAB to be without power to issue restricted certificates to any of the 60 applicants. Instead, they urged the supplemental charter classification for the nonskeds out of which eventual certification may arise.

To accomplish the latter, it was recommended that CAB adopt a policy for automatic institution of proceedings when the volume of supplemental service exceeds 15% of the scheduled airline traffic over a particular segment or segments. In such proceedings, the supplemental carrier could apply for a certificate and "all other things equal, priority of consideration will be given to the carrier or carriers that developed the traffic."

A maximum of 33 of the 60 applicants would be eligible for the new classification.

The Examiners also urged a study of certificated operations in the transcontinental and West Coast markets. They recommended an informal investigation of such operations of American, TWA, United, and Western to determine if a formal proceeding "looking toward orders requiring these carriers to provide adequate coach service" is necessary.

A further recommendation was that the new class of carriers be "encouraged to establish a suitable clearinghouse for exchange of information on availability of commercial charter traffic and services."

The Examiners gave a 35-day period for exceptions and briefs and the 3½-year-old case should move to oral argument either in late May or early June.

United Air Lines Tests New Anti-Collision Lights

United Air Lines has set up a test project on one of its DC-4 aircraft to evaluate the new strobe-light anti-collision lighting system developed by Transocean Air Lines.

The TAL arrangement consists of six strobe lights installed three on top and three on the bottom of the fuselage in line from front to rear. The forward light is located about 35 feet from the tail section lights, and the strobe tubes are flashed 40 times a minute.

Advantage of this type of system is that it permits ready recognition of aircraft attitude and relative position. The light pulses appear as a "rolling ball" moving in the direction of flight and attract attention without looking at them.

Weight of the complete system is about 11 pounds and power consumption 120 voltamperes. Transocean is preparing a number of installation kits in anticipation of test projects by airlines other than United.

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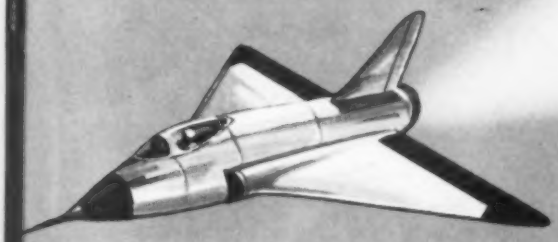

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